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The Forest Products Laboratory

A

Golden Anniversary

Record



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Madison Laboratory Lumber in Kidnapping

MAILED yesterday to the U. S. Commissioner of Investigation here was a report and panel of evidence obtained in the investigation of lumber which may have been used in the kidnaping of Charles J. Lindbergh, Jr., in New Jersey. The report was made available to the National Lumber Association by Arthur W. Miller, of the laboratory staff presented earlier.

Laminated Box Introduced

Here FPL Whips Wood Shrinkage
for Army, Navy, But Helps All

An 80 lb.
rule con-
sists of four
imental
baseball
in the
FPL

Even since the birth of time,
wood has been swelling and
shrinking as it grows.

Roosevelt Impressed With Laboratory Here

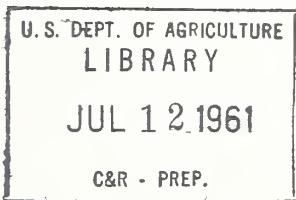
MADISON, WIS.—President Roosevelt is particularly impressed by the work of the Forest Products Laboratory here, he said yesterday.

NEW DRY KILN SCHEDULES

The new dry kiln schedules are now available at the Madison laboratory. They are designed to meet the needs of the lumber industry in the production of standard dry kilns. The new schedules do not mean that the old ones are no longer valid, but it does mean that individuals who have individual needs will have more opportunities to meet them.

The Record
of the
Forest Products Laboratory

Golden Anniversary



June Second, Third, and Fourth
Nineteen Hundred Sixty

Madison, Wisconsin

PRESESENTATION OF THE

Distinguished Service Award



THE HIGHEST HONOR of the U.S. Department of Agriculture, its Distinguished Service Award, was presented to the Forest Products Laboratory on its fiftieth birthday celebration in Madison, Wis., June 2-4, 1960. E. C. Betts, Jr., (left) Department personnel director, congratulates Laboratory Director Edward G. Locke during presentation ceremonies at the Golden Anniversary Banquet.

Forest Products Research--

THE NEXT 50 YEARS

June fourth, nineteen hundred and sixty, commemorated the Golden Anniversary of the founding at Madison, Wis., of the Forest Products Laboratory of the Forest Service, U. S. Department of Agriculture, in cooperation with the University of Wisconsin.

With representative forest industry leaders, educators, scientists, and government administrators in attendance, the world's first wood research laboratory exhibited many fruits of its past work and current investigations as some 5,000 guests and visitors looked and listened. The theme of the Golden Anniversary Celebration was "Forest Products Research . . The NEXT Fifty Years!" Many of the guideposts established by the speakers for future work will, in that span, no doubt become milestones in wood's history along with those described in this official record of the fiftieth birthday of the U.S. Forest Products Laboratory.

The good will of the forest products industries, expressed in program speeches, plaques formally recognizing industries based on FPL research, and attendance at the several official Golden Anniversary functions, is acknowledged with sincere appreciation.

Program

THURSDAY, JUNE 2, 1960

REGISTRATION -- 5:00 p. m.

Facilities have been established at the Memorial Union of the University of Wisconsin for registration, banquet tickets, and other information.

BANQUET -- 7:00 p. m.

Great Hall, Memorial Union, University of Wisconsin

PRESIDING — Edward G. Locke, Director,
Forest Products Laboratory

INVOCATION — Dr. Morris Wee,
Pastor of the Bethel Lutheran Church, Madison, Wisconsin

MASTER OF CEREMONIES — George A. Garratt, Dean,
School of Forestry, Yale University

ADDRESS OF WELCOME — Honorable Ivan A. Nestingen,
Mayor of Madison

AWARDS —

Citation from the University of Wisconsin to McGarvey Cline, first
Director of the Forest Products Laboratory —

Presented by Conrad A. Elvehjem, President, University of Wisconsin

Distinguished Service Award to Forest Products Laboratory —

Presented by Ernest C. Betts, Jr., Director of Personnel, U. S. Department
of Agriculture

INTRODUCTORY REMARKS — Richard E. McArdle, Chief,
U. S. Forest Service

ADDRESS — “Forestry Research and Creative Forestry” —
Ervin L. Peterson, Assistant Secretary of Agriculture

Significance of the Golden Anniversary Celebration

EDWARD G. LOCKE, Director
Forest Products Laboratory, Forest Service
U.S. Department of Agriculture

I can distinctly recall a Forest Products Laboratory meeting held here in the University of Wisconsin* Memorial Union back in 1946. It was presided over by Cap Winslow, and was between World War II and the Korean War. Television was still a curiosity; commercial jet transportation was a dream; nearly 24 hours were required to fly the Atlantic; space flight was only a Buck Rogers concept. The aspen of the north woods was treated as a weed, and the semichemical pulping process was still essentially a laboratory curiosity. That was only a little over 10 years ago, and with the acceleration of research now taking place, one is hardly capable of imagining what the next 50 years will hold.

This birthday we are commemorating will combine a peek at the future with a summing

*The Forest Products Laboratory is maintained by the Forest Service, U.S. Department of Agriculture, in cooperation with the University of Wisconsin on the west end of its beautiful campus, overlooking Lake Mendota.



DR. EDWARD G. LOCKE, Director of the Forest Products Laboratory, presided over the Golden Anniversary Banquet.

up of the past. On behalf of all of the 375 employees of the Forest Products Laboratory, I want to welcome you to this, its Golden Anniversary Celebration.

During the past several weeks, it has been my privilege to read many congratulatory letters. I do not feel that I personally need to be modest about the accomplishments of the Forest Products Laboratory since I have been its Director only since last fall. Credit for the wide acclaim awarded the Laboratory from many sources on this anniversary occasion rightfully belongs to the past and present staff that has worked under the guidance of the previous five directors--McGarvey Cline, Howard F. Weiss, Carlile P. Winslow, George M. Hunt, and J. Alfred Hall--and myself. For it has been the creative minds of dedicated men and women that have established the Forest Products Laboratory as an organization unique in the world, not the physical structure itself or the array of scientific equipment within. I would be remiss if I did not pay tribute to those who have guided the Laboratory through these 50 years.



McGarvey Cline
1910-1912



Howard F. Weiss
1912-1917

McGarvey Cline, now of Jacksonville, Florida, was the first director of the Forest Products Laboratory. He served in that post from 1910 through 1912. An engineer from Purdue, Cline was the man who sparked the idea of centralizing forest products research at one institution. I would like to quote a few passages from a recent letter from Mr. Cline: "One cannot resign from being a parent, and surely a 'Golden Anniversary' is a splendid time to acknowledge the parentage and to beam with pride upon the Forest Products Laboratory..."

"There were initial controversies and successes which Howard Weiss and I enjoyed, for it was Howard Weiss who cast his lot with me in the struggle to bring the Laboratory into existence.

"We shall be sorry not to see you all at this memorable time, but we shall be thinking and dreaming of the compounded successes of the Laboratory. Our every great and good wish to you and your staff."

I cannot resist a personal touch--Mrs. Cline told me that she is tremendously sentimental about the Laboratory, for it was here that she took her class in wood finishes. She and McGarvey have confessed many times since then the essential spark between them jumped then and there.

From an earlier letter, Mr. Cline wrote-- "There were two other men who were effective supporters of the movement to create the Laboratory and give it the dignity of a major division of the Forest Service directly respon-

sible to the Forester. The men were Howard F. Weiss and R. S. Kellogg. Kellogg was doing some special work for Mr. Pinchot, and was very helpful in winning Mr. W. L. Hall, the Assistant Chief in Charge of Products, over to the idea and in securing the approval of Mr. Pinchot."

The Royal S. Kelloggs now live in Palmetto, Florida, but still maintain the old family summer cottage near Minocqua, Wis. In a recent letter, he asked me to emphasize "that everything was concentrated at Madison because President Van Hise of the University was big enough to grasp the opportunity and provide the grounds and building. . . . It was said that it was the function of the University to 'teach anybody anything anywhere,' and that is just about what the University has done for the people of Wisconsin."

Howard F. Weiss, an engineer from Yale University, was the Laboratory's second director. He served as Assistant Director under Cline from 1910 to 1912, and was Director from 1912 to 1917. After leaving the Laboratory, he continued to live in Madison until his death in 1940. Tonight I would like to introduce to you Mrs. Howard F. Weiss, who still makes her home in Madison.

Carlile P. Winslow, another engineer from Yale, took over the reins from Weiss, and guided the Laboratory through two World Wars and the depression of the 1930's. He retired in 1946. Under Cap, the Laboratory outgrew its original building, and the University of Wisconsin, true to its tradition of generous cooperation, provided the present 10-acre site. Congress appropriated \$750,000, and the present building was occupied in 1932. I am certain that Cap would have liked nothing better than to be on hand to join with us in celebrating the origin of the institution he headed for so many years. But a recent letter from Cap's brother, Cameron, told of Cap's very critical illness in Washington, D. C.

George M. Hunt, a chemist from the University of California, was Director of the Laboratory from 1946 to 1951. He is now serving as an FAO Technical Advisor to the Philippine Forest Products Research Institute, a post he has held since 1954. Time and distance make it impractical for him to be here, although he most surely is with us in spirit.



Carlile P. Winslow
1917 - 1946



George M. Hunt
1946 - 1951



J. Alfred Hall
1951 - 1959



Edward G. Locke
1959 -

I would like to read you a quote from a recent letter I received from George.

"The service that the Forest Products Laboratory has given to the people of the United States and of the world during the 50 years since its inauguration and through two world wars has been so outstanding that all who have participated in it in any way can be justly proud. Every employee, from the lowest to the highest, and each friend of the Laboratory who has facilitated its activities in any way has an individual right to be proud of its accomplishments. Even those who have at times vigorously opposed or disagreed with the Laboratory have helped keep the staff on its toes and thus have contributed to its success.

"As one who participated in the work of the Lab for many years and whose life has been greatly influenced by it, and also who sometimes disagreed with the powers in control, my pride knows no bounds. I congratulate you all on the stature, the competence, and the accomplishments developed during the first 50 years. I am sure that even greater success lies ahead so long as the Laboratory continues its basic policy of searching for the truth and serving the public in the field of forest products utilization. May the Lab and its staff continue to 'grow in stature and in favor with God and Man'."

J. Alfred Hall, a Wisconsin-trained biochemist from Indiana, was our fifth Director. He served from 1951 to 1959. All of you know Al Hall, who retired last August to the rain-washed climate of Portland to raise rhododen-

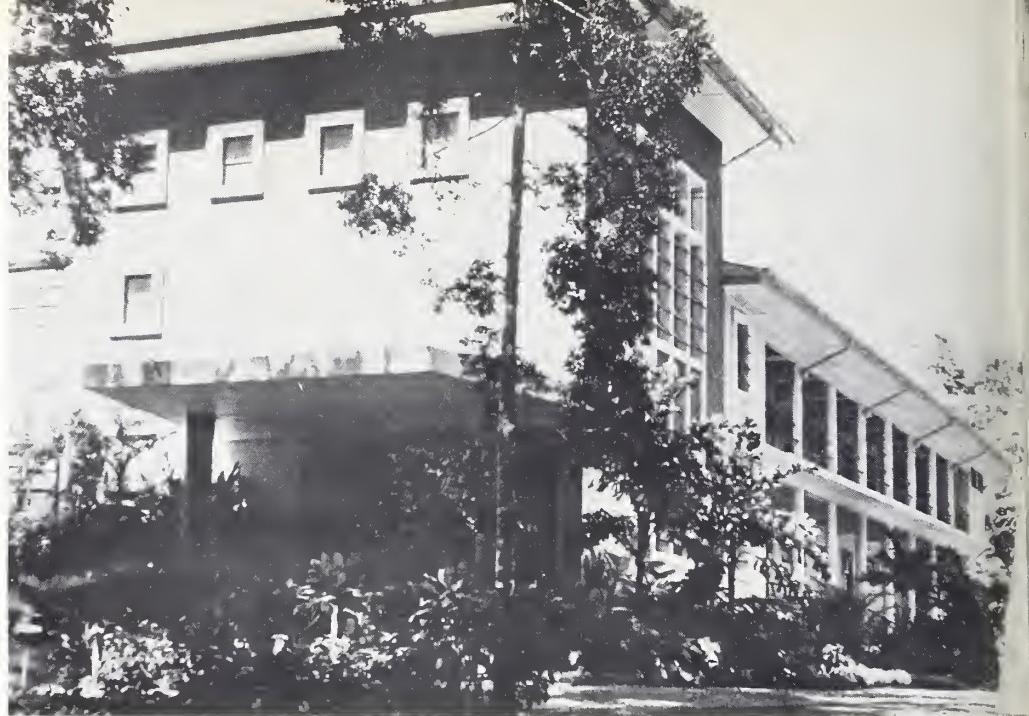
drons, camellias, and azaleas. Al is now self-employed as a consultant. There is little I can add, except to say that I have profited in many ways from the 15 years of close association with him both as my mentor and a personal friend.

Foreign Visitors

There are several visitors from other lands whose presence I would like to acknowledge. Dr. F. E. Siimes, Chief, Wood Technical Laboratory, State Institute for Technical Research, Helsinki, Finland, delegate to the FAO Conference on Wood Technology, Madrid, 1958. Prof. Franz Kollmann, Director, Institute for Wood Research and Wood Techniques, University of Munich, Munich, Germany. Dr. Menachem Lewin, Director, Institute for Fibers and Forest Products Research, Jerusalem, Israel, delegate to the FAO Conference on Wood Technology, Madrid, 1958. Dr. C. G. W. Mason, chemical engineer, representing Alex Entricon, Director, New Zealand Forest Service, Wellington, New Zealand. Mr. Harry Schwartz, Superintendent of the Ottawa Laboratory, representing Col. J. H. Jenkins, Chief, Forest Products Laboratories Division, Forestry Branch, Department of Northern Affairs and National Resources, Ottawa, Ontario, Canada.

There were also letters from many persons in all parts of the world, but time will not permit me to more than acknowledge them by saying that we appreciate their kind words and best wishes. I do want to read from two

THE PHILIPPINE Forest Products Research Institute has benefited from FPL know-how through advisory scientists sent to the Institute and through technical training of many of its staff in Madison.



of them. First, from Stanley A. Clarke, Chief, Division of Forest Products, Commonwealth Scientific and Industrial Research Organization, South Melbourne, Australia:

"Few people can know the great extent of the debt we owe to your institution. We are some 20 years younger in age, but throughout the life of our Division your continued help to us has been of enormous value. Our Division was formed just before the great depression, and the early years were very difficult ones indeed. Fortunately, the training you had given our officers and the wealth of background information which you so freely made available, enabled us to be of immediate value to the industry; we became firmly established and even grew steadily under those difficult circumstances. Without this initial help we must inevitably have fallen victims to the depression.

"We know that we can never repay your laboratory for all the help and assistance we have had. Like a child who cannot repay his parents, but can in turn help his children, we have tried in our turn to assist as much as we can the younger and less well established laboratories of our region. You can take pride in the fact that the help which you gave to us has not been for the benefit of Australia alone, but has manifested itself in many countries.

"With all best wishes for the future of your great laboratory."

And from Eugenio De La Cruz, Director of the Forest Products Research Institute, University of the Philippines, College, Laguna, we received the following letter:

"On the occasion of the 50th Anniversary of the establishment of the U. S. Forest Products Laboratory, let me congratulate you and your entire staff on 50 years of outstanding service. You have helped not only the people of the United States but also the people of the whole world through your accomplishments and through the example you have set.

"The Forest Products Research Institute of the Philippines has patterned itself very largely after your Laboratory, and has profited greatly from the advice given in innumerable instances by members of your staff. You have given extensive training to many members of our staff, you have sent some of your present and former staff members to serve as 'technical assistance experts' or to advise briefly with us, and you have even sent us numerous donations of books and other publications. Our debt to you can never be repaid. We know also that you have extended more or less similar service to a number of other countries. I regret that I cannot be with you during the anniversary observance, but, fortunately, three members of our staff will be present.

"It is the ambition of our very new Institute some day to attain a competence and reputation for accomplishment comparable to what



*IVAN NESTINGEN, Mayor of Madison,
welcomed the group.*



*GEORGE GARRATT, Dean of the Yale University School
of Forestry, was Master of Ceremonies.*

your Laboratory has attained during its long life.

"We wish for your continued growth, success, and usefulness in the years to come."

Master of Ceremonies

It is my pleasure to introduce a personal friend who will be our Master of Ceremonies this evening, George A. Garratt, Dean of the Yale University School of Forestry. He has been a member of the faculty at Yale for 35 years, and holds the Chair of Pinchot Professor of Forestry.

A native of New York, who confesses to having been born in Brooklyn, he graduated from Michigan State College (now University), and later received his PhD from Yale. His

career, which began as an instructor in forestry, has been largely devoted to teaching and educational administration.

There was a war interlude when he was on part-time leave and resided here in Madison as Chief of the Division of Technical Service Training at the Laboratory. He supervised the training of 16,000 men of the armed forces and industry in the proper techniques and engineering principles of modern packaging.

I first became acquainted with George Garratt when we both served in 1947 on the original Executive Board of the Forest Products Research Society. He served as its second president in 1949. He was also president of the Society of American Foresters in 1958 and 1959, and is a fellow of that Society. Again, it is my pleasure to have Dean Garratt introduce the speakers this evening.



A PLAQUE demonstrating that the Forest Service itself uses the research information obtained by its Laboratory is accepted by Director Locke from James J. Byrne, Director of the Division of Forest Products and Engineering Research, Washington, D.C. The plaque bears the signatures of the engineering chiefs of each of the 10 Forest Service regional headquarters who supervise the building of bridges, forest fire watchtowers, and other structures on the National Forests.



FROM THE UNIVERSITY OF MUNICH, Germany, came Prof. F. F. H. Kollman (right), head of the school's Institute for Wood Research and Technology, to present the U.S. Laboratory with a scroll greeting from the German Forest Products Research Society. Dr. Locke accepted the scroll during a reception on the first afternoon of the anniversary celebration.





Hall

Betts

Wee

McArdle

Garratt

Locke

Peterson

Elvehjem

Harper Nestinger

Introductory Remarks at the

Golden Anniversary Banquet

RICHARD E. McARDLE, Chief
Forest Service
U. S. Department of Agriculture

The Forest Service passed its fiftieth birthday a few years ago. Within five years after its creation the Forest Service was operating a forest products laboratory. This, I think, is evidence that forest utilization research has been a main point of the Forest Service program from the very beginning.

Henry Solon Graves had succeeded Gifford Pinchot as Chief of the Forest Service only a short time before he came to Madison in June 1910, to help dedicate the new Laboratory then just opening for business in a building the University had erected for the purpose. Graves outlined an ambitious program for the new Laboratory.

The work of the Laboratory, he said, would be founded on the principle that the raw material of forests be made to meet "in the high-

est degree" the real requirements of the people.

The first necessity, said Graves, "is to determine the properties of the various woods." How far have we come in fifty years?

I think we have learned enough about the mechanical properties of our principal commercial species to say that wood has become a true engineering material. Its strength has been defined.

The nature and control of certain physical properties--shrinkage and swelling, moisture movement through its structure, surface and internal stresses, effects of moisture on strength--have been explored to the extent that seasoning and use conditions are much better understood. Processes for curbing

shrinkage have been discovered. But we still have a long way to go to realize fully the aspirations of the founders for complete control at insignificant cost.

Mr. Graves next indicated the need to find ways to prolong the service life of wood. He directed that existing preservatives be examined for their true worth and that treating methods be investigated. That has long since been done. In addition, better methods and better preservatives have been developed. We are now looking into ways of preserving wood without using toxic chemicals. We have come a long way beyond that first assignment.

Another aspect of the Laboratory's work specified by the Chief Forester was investigations of "the multitude of problems of wood utilization."

He singled out paper and the byproducts of papermaking as a major field. I think his aspirations here have been rather dramatically fulfilled. The Laboratory's development of semichemical pulping is rapidly becoming a major means of bringing into use extensive hardwood forests largely unsuited for construction lumber. This development and its more recent variant, cold soda pulping, yield 50 to 75 percent more pulp from wood than the older chemical processes, thereby curtailing waste and pollution. But perhaps even more significant has been the fundamental chemical research that has made possible many notable achievements such as dissolving pulps for plastics, synthetic fibers, films, and other products in which wood, as wood, is unrecognizable.

Yet we are still only on the threshold, the very edge, of chemical utilization. What we need is definite and clear. We need chemical processes that will convert into widely useful things the low-grade, small timber that now in a sense wastes much of our forest land. We need those processes to help pay the cost of rehabilitating those forests, making them more productive.

Moreover, we are faced with a steadily declining forest resource base. Enormous pressures are building up for use of land. Within

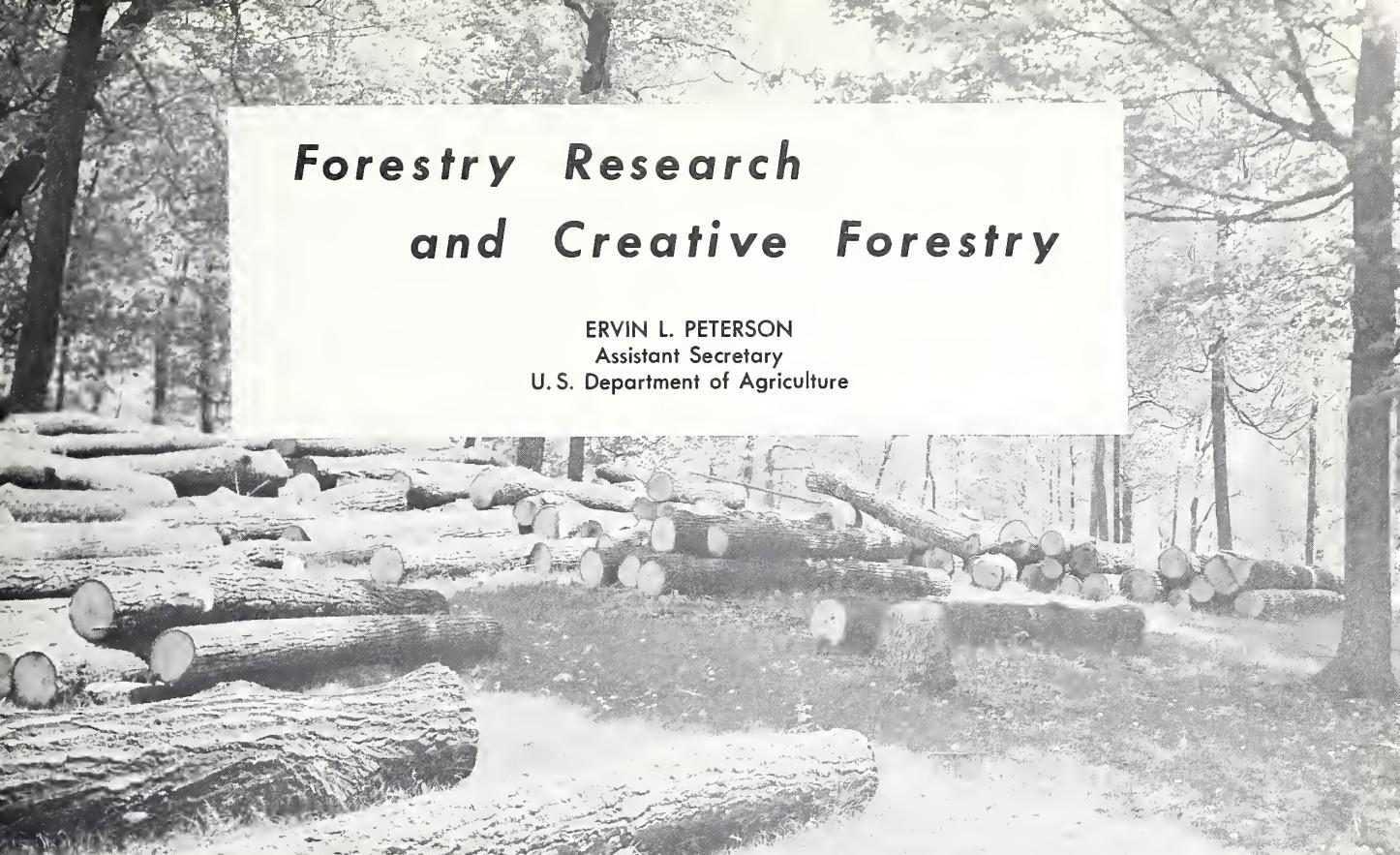


FOREST SERVICE CHIEF McARDLE: "The work here at Madison is vital to the forestry progress we must achieve."

the next few decades urbanization, highway construction, agricultural needs, recreational needs, and other requirements of an expanding population will probably reduce our commercial forest land base one-fourth and our timber-growing capacity by a third.

Couple declining forest acreage with declining timber quality, and you have the best argument I know for accelerating forestry research of every kind. The work here at Madison is vital to the forestry progress we must achieve in the next relatively few years.

I now take pleasure in introducing to you the main speaker of the evening--Ervin L. Peterson, Assistant Secretary of Agriculture.



Forestry Research and Creative Forestry

ERVIN L. PETERSON
Assistant Secretary
U. S. Department of Agriculture

We have joined together tonight to celebrate a birthday. This birthday is, however, different than those which merely note the etchings of time on the face of life. This birthday, we hope and believe, is in fact a rebirth--a regeneration--a renewed dedication of our energies to further extending the horizon of our knowledge of wood, of its properties, of its production, and of its use. For it is by this means we better serve ourselves and our fellow-men. It is by this means we assure the perpetuation of our forest upon which we so greatly depend.

Wood and the forests which supply it have long played an important part in the growth and development of our country. In our earlier history, wood was the principal material used to build homes, to supply fuel, to build the ships which made us a leading maritime nation. It found its way into every facet of our living, of our commerce and industry, of our economic growth and development. It continues to occupy a place of increasing importance in our lives.

Likewise, the great forests which supply our growing use of wood are themselves important to us not alone for the basic mate-

rial--wood--but also for many other values; as regulators of watersheds, as a home for wildlife, as playgrounds for more and more millions of people, as great panoramas of scenic beauty, as an ecologic regulator of our natural environment upon which we depend for food, fibre, and a source of raw products to sustain a highly industrialized, complex economic society where more goods and more services are provided and distributed more widely among more people than anywhere else on this earth.

As a Nation richly endowed with an abundance of natural resources, we have used them with profligate abandon. We have grown rich and strong. It is for us now to exploit a new and limitless resource so as to assure our continued prosperity and strength. That new resource is knowledge--more particularly the knowledge provided by science--by careful and exhaustive investigation and experimentation. By use of such knowledge--we seek to use our resources without destroying them--without impairing their continued capacity to produce--without using up our natural capital. We seek also by this means to get more use from each unit of product while increasing the units as our need for them continues to expand.

In short, we seek to use knowledge to enlarge the bounty of nature. In the management of the national forests we call this multiple use and sustained yield.

This is the challenge to us as we meet on this 50th Anniversary of the Forest Products Laboratory. We view the past with pride. We face the future with confidence.

The Department of Agriculture and its U.S. Forest Service are proud of the progress thus far made in forestry. We hasten to share this pride with the University of Wisconsin--our host tonight--with other great seats of learning--with thousands of individuals, past and present. All have made a contribution to our present fund of knowledge--of our understanding of forestry--of forests--of wood--of better use of our natural heritage.

We acknowledge also the many industrial enterprises and citizens acting in their private capacities--the private competitive enterprise system if you please--wherein the knowledge we have helped uncover has been so productively applied.

The founding of the Forest Products Laboratory fifty years ago launched a new kind of venture unique in a world where at the time the discoveries of scientists and science had not yet been recognized as fundamental to better living and fuller lives for mankind everywhere. This was the first research institution created anywhere in the world for the specific purpose of applying the findings of science to

MULTIPLE-USE PRINCIPLE harmonizes the use of National Forests for wood, water, forage, wildlife, and recreation.



the problems of producers and users of forest products.

But the past is merely prologue to the future. We know the great forests have contributed greatly to the building of a Nation. We recognize the work which has been done here in this laboratory and the men who have done it. It is for us now to build upon the past to meet the needs of the future.

The great forests of a new nation are greatly gone. They have not been replaced with comparable stands of usable timber. In large part replacement stands are inferior species with limited to negative economic value. Much of the Nation's existing forested areas, particularly those of the eastern humid areas are in small ownerships where presently there is little economic incentive to induce either their care or regeneration. Moreover, while on a gross basis forest drain and forest growth are in approximate balance, such a desired condition doesn't apply to usable types and particularly to softwood saw-timber. In addition, pests, diseases, fire and remoteness from market all in their own way take a heavy annual toll of our wood supply.

The tasks ahead of us are large dimensioned. Our thinking, our programs, our actions must be large enough to fit those dimensions. We will, of necessity, use all the knowledge we have accumulated while at the same time developing new knowledge and new techniques for its use fast enough to fully use the forests we have; to make them over as we use them; to enhance rather than impair our forestry capital; and in recreating our forests to create a new kind of forest--one where the trees are tailor made, so to speak, to fit specific and predetermined end uses. These things must be done.

At the same time the forests must be managed to provide in even larger measure all their multiple values--recreation, regulators of water, homes for wildlife, their streams and lakes a habitat for fish, their open spaces for grazing of livestock, portions of them as wilderness sanctuaries, other portions as game sanctuaries, other portions for their scenic grandeur.

Knowledge of how to do these things must come from research. We haven't time for

trial and error. We have little time for experimentation. Yet our actions will be no more productive, no more valid, no more certain of objective than the accuracy and completeness of the knowledge upon which they are founded. That knowledge must come from research. And products research is in my opinion first in importance.

I say that for what to me is a very simple reason. For the present, and for some time to come, the basic economic value to support forestry investments necessary to multiple use and sustained yield management is the value of the wood the forest produces.

Wood is the economic key to this kind of land management of forested areas. Particularly is this true of forest lands in private ownership. The larger private owners are beginning to make this kind of land management work; the smaller ones cannot yet do so. Research--products research--must find a way for them to do it.

We should also recognize that our National landbase is static; our land area is fixed. It will not grow in size. It now accommodates 180 million people. In a few years--by 1975--our population will approximate 230 million persons. By the year 2000--just 40 years away, and a short time in the life of most trees that make up our forests--we may well be a Nation approaching a population of 400 million people--more than twice our present size.

These people are all potential users of forest products. Can their wants be supplied? Will we be able to maintain in forestry use the present acreage devoted to that purpose?

Already there is growing debate about how land--particularly public land--should be managed and used--as conflict of desired uses develops among user groups. Obviously space will be taken for cities and towns, for roads and streets, for parks and playgrounds, for airports, for many other public purposes including more water impoundments.

Moreover, people will want to eat. How much land will be required to produce food and fibre? Will this use conflict with forestry use? There is some evidence that it will. In a case of food or forests, obviously food will take precedence.



ASSISTANT SECRETARY PETERSON stressed the important role of the private competitive enterprise system in creative forestry for a profitable forest products industry.

Have we as a Nation, as States, as local communities, the vision--the wisdom--the courage to act now so as to assure our future comfort and well-being? Do we believe that by research we can so extend the scope of our knowledge and of practical applications thereof that when our population doubles we can then provide from our natural resource base all the products and values all our people will then want?

Is there any alternative to an investment in research now to try to assure that our future wants and needs are met? I don't think there is. That is why I say research--new and more complete knowledge together with practicable and feasible ways to use it--is indispensable to our future--to providing the products of the land which we will want and need--to avoid eating into our natural capital--to permit an enlarging production of land products and natural resource values without impairment of the continued ability of the land to produce.



THE REAL key to our future timber supply lies in the hands of those one out of every ten American families who own small forests.

the opportunity--and the excitement of creative forestry--of man taking control of nature and bending her to the benefit of himself and his fellows everywhere.

Present forestry leadership both public and private needs a thorough biting by the "hurry-up" bug. Time is growing shorter. We have accomplished much in the past. We have come a long way in recognizing the values--both economic and social--of our natural heritage. We are proud of what has been done by both private and public effort. But we must now accomplish in years what has heretofore taken decades.

Knowledge, particularly scientific knowledge, is the key ingredient which more than any other will regulate our rate of progress. But even with adequate knowledge human vision, imagination, creativeness, inspiration, dedication, will determine whether that knowledge will in fact transpose us from harvesters of nature's bounty to creators of larger and larger bounties for harvest to serve the needs of more and more people.

While the importance of research--of scientific investigations--as a creator of knowledge to give us the means to practice creative forestry in its broadest sense, cannot be overestimated, there is still another necessary ingredient to the successful accomplishment of this purpose. That ingredient is a healthy, thriving, vigorous, private competitive enterprise community.

If it is knowledge which stimulates man's creativeness and ingenuity, it is a competitive private enterprise community which affords the best opportunity for that creativeness and ingenuity to find fruitful application.

In no other Nation has this been so well-demonstrated as here in America where we produce more goods and services and distribute them more widely among more people than anywhere else on earth.

Conservation--wise use--multiple use and sustained yield--substitution of science and technology to multiply nature's bounty--these are the challenges to research--to foresters--to land managers--to all users of land--yes indeed to all the people of this Nation--if tomorrow we are to be as well-fed, as well-clothed, as well-housed, and well-provided as we are today.

So this anniversary we now celebrate is more than a birthday--it is a rebirth--a rededication for each of us--a challenge to anticipate and to control the future. To none of us is the challenge greater than to the scientists--to the research workers upon whom we all depend for the knowledge needed for the large tasks ahead.

Foresters can no longer think only of land as a medium in which to grow trees. Professional forestry must broaden its base of thinking. Professional foresters must become in a complete sense managers of land used to grow forests--to produce trees for use--to provide the multiple values we have come to recognize as associated with forests everywhere.

This of course means forestry education must also change with the times. Curricula need to be of such scope and so arranged that there is opportunity for the budding forester--be he in research--in science--or in management--or in production--or in any of forestry's many parts--to firmly grasp the total dimensions of forestry--to perceive the need for,

SUPER TREES may be the result of research as to how genetic factors affect both desirable and undesirable qualities in the trees we now use. Pencil-like increment cores are removed from living trees for evaluation of growth rate, density, strength, and other characteristics.



Under our system reward and punishment are not assessed by Government--by public authority--but rather by our competitive economy--by private enterprise itself--by profit and loss--and it is loss or the prospect of it which keeps us competitive. It is profit or the hope of it which keeps us creative--inventive--ingenuous.

This is a good system--not perfect--but good. It is a creative system. It seeks knowledge for practical application and use in terms meaningful to human well-being and satisfaction. It is a system where everyone cannot run first in every race, but one where-in everyone has opportunity to run.

Moreover, the perpetuation of our private competitive enterprise economy is necessary to perpetuation of our free institutions--of representative Government itself.

Were it not for the profits of this system from which is provided taxes to support all the multitude of public services, including education itself--a substitute for them would have to be found. Government is the substitute most readily available. Anytime the wants and needs of the people, including public services, cannot be provided by our economic system, then that system is in jeopardy of extinction. There is only one visible substitute for it and that is Government itself.

Government doesn't distribute rewards--its distributions are more in the nature of awards where benefits are equated among all recip-

ients. Creativeness, ingenuity, inventiveness, risk in hope of gain--all are discouraged. Progress is equated to the capacity of the less productive--the less inventive--the less creative.

If in our eagerness for progress we should so overload our competitive enterprise system so it cannot provide the goods, the services, the profits for regeneration--the taxes necessary to public use--then as it falters people would likely turn increasingly to Government to fill their desires. Such is the road to mediocrity and stagnation. It need not happen--it must not happen.

Thus our challenges are even greater than they may first appear. Our forests--our lands--have been good to us. We now must be good to them that they may always be good to us. Research, knowledge, used and applied and made fruitful by our private competitive enterprise system points the way.

It points the way in our area of interest tonight to a new concept of forestry--to creative forestry wherein is utilized a progressively enlarging body of scientific and technical knowledge to generate from our lands the kinds of forests and the quality of trees to give us the kind, quality, and quantity of wood products and wood derivatives we will want and need as well as all the multiple use values which are a part of forest land management.

Creative forestry means surveying and measuring the place of wood and its products



CHEMICAL UTILIZATION
of huge quantities of wood residues at a commercial plant in Oregon.

in our Nation's life, then proceeding to provide the kind of trees from which the economic stature of wood may be maintained in proportion to the growth of our entire level of living.

Creative foresters will derive from the land much more than forest products. They will practice multiple use of the most intensive character. An exploding population presenting a pressure of people against our land space will permit no less.

Creative forestry will take control of nature, wood, water, habitat for fish and game, recreation, scenery, forage for livestock--all will be provided to the maximum capability of the land.

We have made a good start. Let's now get on with the tasks before us with vigor and determination to use what knowledge we have effectively while increasing it to achieve the still greater effectiveness we will need as public use of wood and of forests continues to expand.

The interests of private enterprise and of public forestry are common and complementary. We have common objective in maintaining a healthy, prosperous, progressive forest products manufacturing industry.

We have common objective in broad and permanent markets upon which such an industry depends.

We have common objective in maintaining public acceptability of wood as a building material and as a raw material for manufacturing processes.

We have common purpose in maintaining a strongly supported program of forestry research and education from which comes the new knowledge needed to manage our forest properties most efficiently and productively, how to attain broad uses for wood and its derivatives, how to develop economic use for forest growth which presently has either low economic value or none at all.

Around the concept of creative forestry--of multiple use and sustained yield--of wise use of nature's bounty--of helping nature to greater fruitfulness--we can all unite.

This then is the challenge which is our heritage from the first 50 years of work in the Forest Products Laboratory and in the field of forestry of which it is a part. We can pay no greater tribute to those who conceived this laboratory and who have carried forward its work than to eagerly accept this challenge. This we do. We will extend our fund of knowledge--we will assert the validity of the private competitive enterprise system as the best vehicle for the application of that increasing fund of knowledge to the purposes of creative forestry and to a fuller life for the citizens of this great Nation and of mankind everywhere.

Program

FRIDAY, JUNE 3 -- 9:00 a.m. - 12:00 noon

GENERAL ASSEMBLY

Memorial Union Theater, University of Wisconsin

PRESIDING — Edward G. Locke, Director, Forest Products Laboratory

“Research in Today’s World” — Conrad A. Elvehjem, President, University of Wisconsin

“Research, Mainspring for Lumber’s Future” — Frederick K. Weyerhaeuser, Chairman of the Board, The Weyerhaeuser Company

“Forest Products Research and the Paper Industry” — Howard E. Whitaker, Chairman of the Board, The Mead Corporation, and President, American Paper and Pulp Association

“Forest Products Research and the Plywood Industry” — W. E. Difford, Executive Vice President, Douglas Fir Plywood Association

“The Stubborn Genii” — Samuel Lenher, Vice President, E. I. du Pont de Nemours and Company

GOVERNOR’S LUNCHEON

12:15 p.m.

Great Hall, Memorial Union, University of Wisconsin

PRESIDING — Edward G. Locke

INTRODUCTORY REMARKS — Stanton W. Mead, President, Consolidated Water Power and Paper Company

ADDRESS — “Wisconsin’s Forests — For Recreation, Conservation, and Industry” — Honorable Gaylord Nelson, Governor of Wisconsin

FRIDAY, JUNE 3 -- 2:00 - 5:00 p.m.

INSPECTION OF THE FOREST PRODUCTS LABORATORY

(Special shuttle buses available from the main entrance of Memorial Union to Forest Products Laboratory from 1:30 p.m. to 2:30 p.m.)

TOURS FOR ANNIVERSARY GUESTS — Report at main building of the Laboratory on Walnut Street

AWARDS —

Prefabricated Housing Plaque. Presented by George E. Price for Home Manufacturers Association — 3:00 - 3:10 p.m.

Insulating Board Scroll. Presented by Robert A. LaCosse for Insulation Board Institute — 3:15 - 3:25 p.m.

Semichemical Pulping Plaque. Presented by Walter Swanson for American Paper and Pulp Association — 3:30 - 3:40 p.m.

Laminated Arches Plaque. Presented by Frank J. Hanrahan for American Institute of Timber Construction — 4:00 - 4:10 p.m.

Exterior Plywood Plaque. Presented by W. E. Difford for Douglas Fir Plywood Association — 4:20 - 4:30 p.m.

(Special shuttle buses available from main entrance of Forest Products Laboratory to Hotels Loraine, Belmont, and Edgewater from 4:30 p.m. to 5:30 p.m.)

Research in Today's World



CONRAD A. ELVEHJEM, President
University of Wisconsin
Madison, Wisconsin

THE FPL (arrow) is maintained in cooperation with the University of Wisconsin at the west end of its campus.

It is a pleasure to represent the University of Wisconsin at this celebration of the 50th anniversary of the U.S. Forest Products Laboratory. We have always looked to the Forest Products Laboratory as an exceptional example of the service that can be performed by an organization dedicated primarily to the pursuit of scientific knowledge. You have served, too, as a model for the establishment of other research institutions throughout the world, not only for those intended for research on wood products but for work in many other scientific fields as well. It is a record of which both you and this country can be justifiably proud.

We of the University are particularly familiar with the work of the Laboratory because we have looked to you for assistance in solving many of our immediate problems. The fact that the University has been able to draw freely

upon your resources has meant a great deal to us in terms of both our research and our educational programs. We are gratified that this cooperation between the Forest Products Laboratory and the University shows every evidence of continuing to expand during the years to come.

I would like to talk briefly today about the place of research in our modern industrial and governmental life. The statement was made not long ago that no business or industry could remain robust on a diet of the limited technical knowledge available to it, say, 25 or 50 years ago. This truth is virtually self-evident to us today, but we might realistically expand the statement far beyond the spheres of economic competition and draw into it the entire range of civilized activity. To do so, we would find it necessary to revise the statement to this extent: Modern civilization can-

not remain robust on a diet of the technical knowledge available, not 50 or 25 years ago, and not even 10 or 5 years ago, but on a diet of the technical knowledge available today.

This is true for a number of reasons. We have encountered some rather immediate and pressing problems for which we do not, at the moment, possess satisfactory answers; problems brought about by rapidly expanding world populations, increasing demands for progress in the world's underdeveloped regions, and increasing international friction. I do not believe that these will constitute insurmountable obstacles to further progress for the human race, but I do believe that they will be solved only by the acquisition of new basic knowledge and understanding, basic knowledge which we do not yet possess, and which can be acquired only through research on all phases of human activity. The more rapidly we expand our research efforts in the various fields of endeavor, the more rapidly will we progress toward an ultimate solution of many of the tragic problems that beset us now.

We are aware of the tremendous value of research; there is little question that we are living better, healthier, more generally satisfying lives today than did our antecedents of 50 years ago. To date we have not acquired all of the knowledge that it would be useful for us to possess. We have, as a result, every reason to expand markedly our efforts to apply disciplined ingenuity to the difficulties we have already encountered and those which we can expect to encounter in the near future.

Let us examine one or two of these problems. In the first place, our world population is increasing at a rate which, if it continues, sooner or later will require some major revisions in the kinds of food which will be available to us. Some individuals have estimated that we will begin to feel the effects of the population increase within the next decade. The first influence will be economic, with a gradual elimination of surpluses as more consumers appear on the scene. In the past few decades, we have accomplished major technical advances in food production and processing, but we must now expand these programs to maintain adequate food supplies in the foreseeable future. At the same time that we attempt to maintain adequate food balances for those peoples who are accustomed to abun-

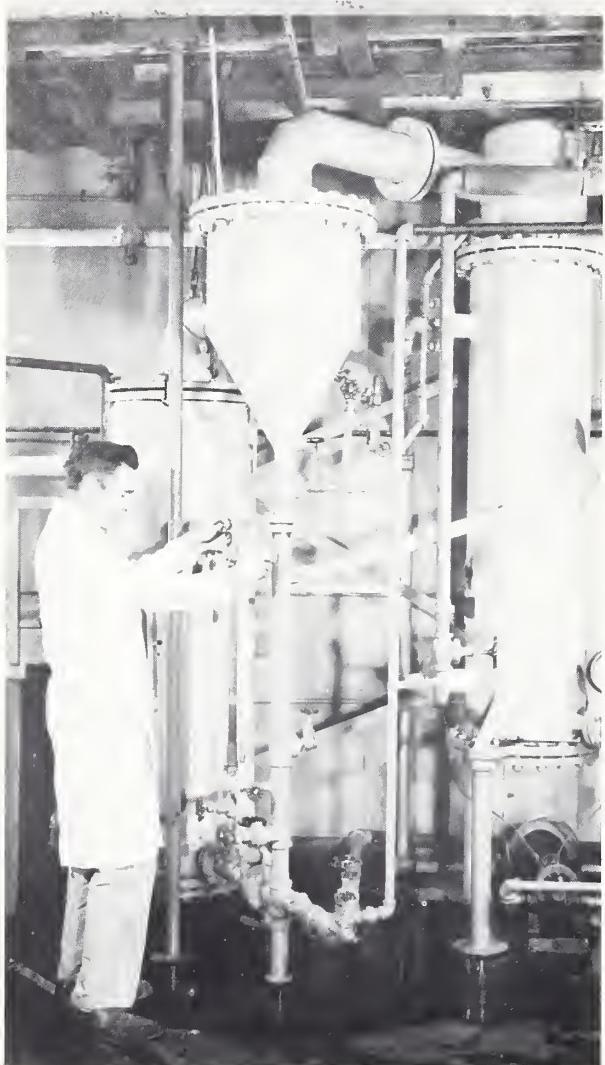
dance, we will find it necessary to intensify our efforts to improve conditions in underdeveloped countries.

This is but one aspect of the adjustments that we will find it necessary to make as our cities become larger, our rural areas increasingly productive. New problems will arise in nearly every other aspect of existence. Some of these will be matters of concern to us primarily as individuals, such as housing, transportation, medical care. Others will concern us as civilized individuals attempting to live amicably and productively together; these will include such things as expansion of educational opportunities, economic and social adjustments brought about by increasing mechanization of productive industries, and the unfortunate, but nevertheless real, need for maintaining a superior position in international affairs.

The innovations that have been brought about by science and technology in the past century have changed human life more than it had changed in all previous centuries since the dawn of man's first efforts toward civilization. The changes to be anticipated in the future will come at an increasingly rapid rate, and comparable revolutions in our daily living will take place in much shorter periods of time. As one of our noted philosophers has pointed out, there is at present no indication that scientific progress is eventually to reach a point of diminishing returns. I think we might all agree that scientific investigation is the great adventure of our time. While this is true, in actuality we have only within

THE NEW AND THE OLD. For our economy to remain robust, we must continue to develop and apply new technical knowledge to all facets of living. Here, glued-laminated rafters combine gracefulness, utility, and ease of erection in modern barn construction.





RESEARCH AT THE FPL must carry ideas from the laboratory to actual small-scale plant operations to prove that scientific theory can be translated into economic progress.

appreciation of scientific accomplishment, when the elegant beauties of our knowledge of the universe are as generally prized for their meaning as for their practical value.

There are no real barriers to the understanding of science. It is almost inevitable that as advanced educational opportunities are made more generally available, so will there be an increasingly intense interest in scientific conquest. Lee DuBridge has pointed out that the questions which puzzle mankind remain our great unconquered wilderness. And he adds that the "adventure of this conquest will mount in interest as the centuries go by."

Contrary to a widely established notion, science is not destined to become the exclusive province of the well-trained few. By its nature, it is of intense interest to everyone, and there exist no unsurmountable intellectual barriers to as full and rewarding an appreciation of science as we now have of our popular arts and literature.

I believe that the United States stands in a unique position in the general area of scientific progress. During the past century we have grown in scientific stature from an apprentice to the great scientific minds of Europe to full competence in nearly all of the major fields of research. We often fail to take into account two of our greatest ideological assets. The first of these is that in America, almost exclusively, historically we have joined the goals of scientific progress with the ideals of our democracy. We seem nearly alone in our pursuit of the bold ideal that the benefits of civilization and new knowledge can and should be made available to all. We also seem alone in our cultivation of the idea that a general and widespread appreciation of scientific advance, the opening of new frontiers of the intellect, is an endeavor in which all can take part, as intelligent and interested spectators, if not actual participants.

the past few years begun seriously to embark upon an era of intense research, an era in which our industry and our government have begun to invest a sizeable proportion of annual income in research. Ideally, we should consciously devote a specific proportion of our gross national income to the one investment that makes continued progress possible--the investment in new knowledge.

While it is true that we have made astonishing progress in recent years, I think it should be clear that the Golden Age of Science is still in the future. I think it will have arrived when not only the practicing scientist, but everyone, can take real and abiding satisfaction in discovery, when each individual possesses an



The future is always uncertain, but barring tragic catastrophe, the way is opening for a new age of human progress and adventure which will rival the great periods of progress in our past. The next few years or decades may very well be crucial ones, for during this period we must establish a world free from the tyrannies of war and oppression. Once, however, this period of upheaval has been safely traversed, we will enter upon a long and exciting era of exploration and adventure, not necessarily of space, perhaps, but certainly of the mysteries that we see in the atom, in the chemistry of living molecules, in our minds, and in the hundred other puzzles that lie at the foundation of every science.

While these are things that I believe we do not consider with sufficient frequency, I am always tempted to recall the story of the two government scientists discussing some of the perplexing problems of the administration of research. The first said: "There is no question in my mind that within the next 25 years America will become the intellectual center of the world." Said the second, "If that's to be the case, we'd better get started."

I think the moral of the story, if it has one, is that we've got more to do than we may realize. But we have made encouraging progress, and if all of our efforts to attain peace and to progress in human affairs were of the caliber of the research conducted by you of the Forest Products Laboratory on the utilization of one of our most prized resources, we will have little to fear.

Again, let me repeat that it has been a pleasure to represent the University on this occasion, and I feel we of the University would all agree that many of the uncertainties of the future would be greatly alleviated by taking your work as a model.

THE COMPLEX CHEMISTRY of the cellulose, lignin, and extractives of wood is studied in minute detail in unrelenting efforts to unlock Nature's secrets and find useful ways to utilize wood residues and low-value trees.



THE LOBBY of the U.S. Forest Products Laboratory.





Research:

Mainspring for Lumber's Future

F. K. WEYERHAEUSER, Chairman of the Board
The Weyerhaeuser Company
Tacoma, Washington

It is a source of great personal satisfaction to me to play a part in these ceremonies which celebrate the 50th Anniversary of the founding of the Forest Products Laboratory. I feel greatly honored to be invited to do so. This institution has made a tremendous contribution during the past fifty years to the forest industries and to the American people.

It has made so many contributions to our understanding of wood and its qualities and done so many things to help the forest industries in waste utilization and product improvement that there is not time to list them here. The technical people of our industry have been coming to Madison for help ever since the Forest Products Laboratory was founded. My own associates have never failed to find a re-

ceptive ear and a cooperative spirit. I remember that we asked for help in appraising a fireproofing process back in 1916 and got it. The results of research by the Forest Products Laboratory in hardwood fibers were very helpful to the Wood Conversion Company in 1920. Charles Ingram of the Weyerhaeuser Company asked the Laboratory to do some work on the salt seasoning of fir timbers some years back. I remember coming here about 5 years ago to hear the results of studies on paint failure which were arranged by Clark Heritage.

Colonel William Greeley described the founding of the Forest Products Laboratory as "one of the most constructive moves in the whole gamut of conservation."

I can remember "Cap" Winslow coming to meetings of the National Lumber Manufacturers Association year after year and asking its representatives, "What can the Forest Products Laboratory do to help the Industry? Tell us what you need!"

Nowhere in this country has so much fundamental work been done on wood and its constituents.

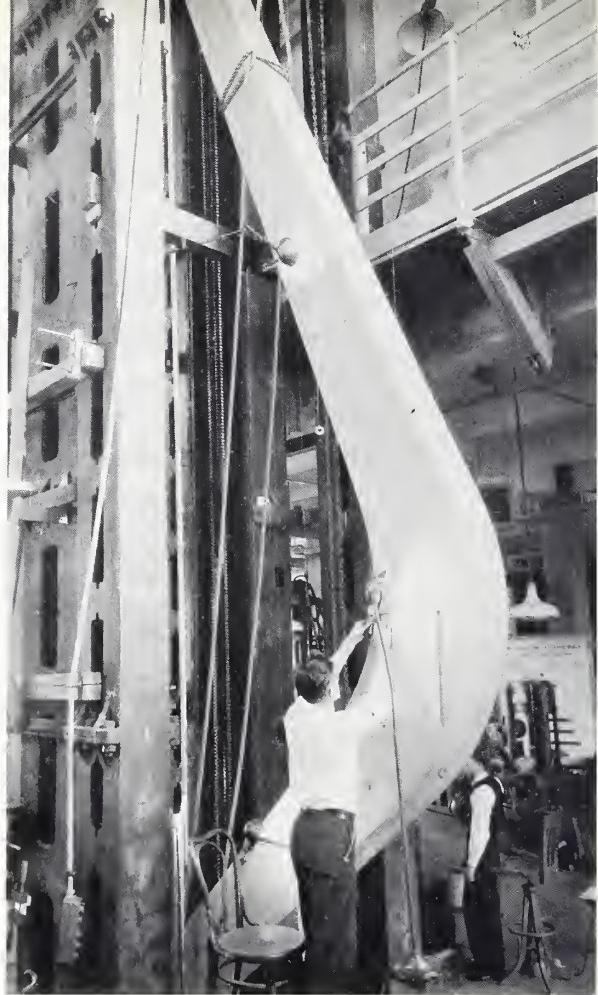
There has been a long line of able and dedicated scientists at the Forest Products Laboratory. I want to congratulate Dr. Locke and his colleagues and also Chief Forester McArdle on the high standards of technical competence and on the constructive achievements of this institution.

Dr. Locke suggested that I talk about research in the lumber industry--so, if these remarks of mine need a title, it is "Research--The Mainspring for Lumber's Future." Webster's Dictionary defines research as "critical and exhaustive investigation or experimentation having for its aim the revision of accepted conclusions in the light of newly discovered facts." I think of research more simply as the search for new and improved products and methods.

Most people think of the lumber industry as separate and distinct from pulp, paper and plywood--but the fact is that these industries draw their raw materials from the same source and are very closely integrated. Like Siamese twins, it is hard to separate them. I will discuss research in the lumber industry from the point of view of a land owner and timber grower--and if some of my remarks spill over into other related industries, please forgive me.

The American lumber industry was born when the first white settlers reached this country from Europe and for the next 300 years it constituted our principal forest industry. The forests furnished the raw material for the settling of our continent--for the building of its homes, farms, factories, and churches.

The pulp and paper industries started to evolve about 100 years ago and have had their great growth in the last 30 years. Softwood plywood is an even younger industry, but is showing the same great vitality. More re-



DESIGN PRINCIPLES for glued-laminated beams and arches developed at the Forest Products Laboratory have helped maintain wood as a highly desirable material of construction in modern architecture.

cently, hardboard, particle board, flake board and other infant, wood using industries have taken root and now show promise.

While these newer industries have been gaining markets, lumber has been losing markets. After 1909 the overall production and consumption of lumber in this country levelled out and, except for the extremes of depressions or postwar booms, has remained static. The per capita consumption of lumber has declined right down to the present time. Its loss of markets has been truly tragic. Corrugated paperboard, a wood based product, has taken the container market. Metals and masonry have preempted the non-residential building market. Sheathings made of wood fiber, sugarcane and plywood, have replaced vast amounts of one-inch boards in residential construction because of their lower labor cost of application. Prepared shingles and metal sidings are battling with wood bevel and bungalow siding for exterior walls of residences.

Concrete slab construction has supplanted many wooden floors. Asphalt roofings now cover roofs in place of wooden shingles. Hollow flush doors have replaced the old solid wood panel doors. Metal sash competes with wood sash. And so it goes!

The competitors of lumber are skillful innovators and strong promoters. They also have the financial ability to do an adequate research, advertising and marketing job.

Sometimes lumber wins a skirmish. The metal ring connector brought over from Europe through the efforts of Axel Oxholm and Wilson Compton gave the use of lumber for structural purposes a tremendous boost during and after World War II.

Men of the Forest Products Laboratory helped to introduce the laminated beam and laminated arch to this country during the 30's. The advent of better adhesives has made possible better plywood and permitted the successful commercialization of edge and end glued lumber. Perhaps the application of glue to wood products has been the single greatest improvement in the use of wood that has occurred in our time.

Other great advances have been improvements in the drying and seasoning of lumber and the advent of preservative and fire retardant treatments. The Forest Products Laboratory has played a major role in each of these improvements.

So, while the traditional lumber industry has failed to increase its volume in proportion to the population increase of the past 50 years, other forest industries have largely made up for lumber's loss. The overall result has been an increased demand for trees and such an increase in their market value that private industry can earn a small return from its tree growing operations.

The American public and the American business community place the lumber industry in the same category as the horse and buggy. They regard its lack of enterprise in research and development as a sure sign of its early demise. The pulp and paper industry has spent less than one percent of its sales dollars for research and lumber substantially less than that. Industries that compete with wood, such



MOISTURE METERS based on electrical resistance, developed at the FPL, make it possible to determine whether lumber has been seasoned properly for house construction. For any industry to prosper, satisfied customers are essential.

as aluminum and plastics approach 4 percent of their sales dollar in research expenditures.

Indeed, whatever progress the lumber industry has made in innovation and improvement has been accomplished with a minimum amount of assistance by technically trained people and with a minimum of true research activities. Exceptions to this include research efforts by the Forest Products Laboratory itself, some industry associations, and some manufacturers of products such as paints, chemicals, preservatives, adhesives, and machinery which serve the wood industry. Whatever success the industry has had in retaining markets, however, should be credited more to a truly remarkable raw material, wood, and to its adaptability to a wide variety of uses, then to the skills of the lumber industry.

One wonders why the industry has not taken better advantage of the facilities of this great laboratory? Why have individual lumber companies failed to spend the money and effort necessary for research and for the development of improved products?

The lumber industry originally faced an existing and growing demand for its products so it did not develop research and marketing skills. Production was its problem. Hence it never learned to meet the competition of the newer building materials when they appeared. The average lumber operation required no greater technical skills than those of a mill-wright or a boss logger. The lumberman could not understand any reason for



NATURAL FINISHES to preserve the beauty of wood siding are becoming increasingly popular. This accelerated weathering device has shown that an FPL natural-finish formulation will give years of service.

improving his product and did not command the technical skills to do so anyway. But the pulp or paper manufacturer was quite a different kind of person. He did possess technical training, and he understood the need for product and process improvement. Similarly, the plywood, hardboard and particle board industries have had to learn about adhesives and plastics. Consequently, they acquired a scientific and research point of view.

The lumber industry, with few exceptions, never learned to spend research dollars to good effect. When "Cap" Winslow offered technical help to the lumber industry, its members did not know what to ask of him.

Also, the lumber industry has traditionally had a short-term outlook. Fifty years ago my father, John Philip Weyerhaeuser, who incidentally was the best lumberman I ever knew, frequently stated that a lumberman could not afford to carry more than 20 years' supply of trees because the taxes and other costs that such a large investment in timber involved would eat him up. Certainly the hazards which faced individual lumbermen was great. Until recently, private forestry was economically impossible, so the industry had to adopt a short-term outlook.

The lumberman has always faced a tremendous fire hazard. Only has one to look back

at the record from the Peshtigo fire of the 1870's; the Hinkley fire of the 1890's; the Yacolt fire in Clark County, Washington in 1902; the Cloquet fire in 1918; and the various Tillamook burns, to recognize how terrible this has been. It is only with the development of modern fire fighting techniques and the outstanding cooperation that has been developed by private and public agencies--and the public, itself--that we have begun to control the hazards of fire. Even now, there is always the possibility of extreme low humidity, high winds, and the carelessly dropped cigarette that can cause a holocaust.

The instability of the industry has tended to keep it from having a long-range point of view. The building cycle, itself, has been extreme in its ups and downs. The lumberman has gone from rags to riches and back to rags--again and again.

The cries of timber famine 50 years ago, whether justified or not, led to widespread speculation in western timber. The public was led to believe that trees would shortly become tremendously valuable with the cutting out of southern and eastern timber. Therefore, during the 20's and 30's the burden of carrying charges led to such over-production that destructive competition eliminated the possibility of a profitable lumber industry. All of these factors resulted in a lumber industry lacking the financial means to conduct programs of research and development or to commercialize activities which might have resulted therefrom.

Another problem which has faced many lumbermen is that a radically new product (such as might come out of efforts to utilize residues) puts him into a new business which he does not understand and into the manufacture of a product which he does not know how to sell. I remember many years ago a group of lumbermen telling an inventor they were not interested in making any product to be sold in bottles, no matter how good it was.

Another barrier to innovation in the industry was that most lumber enterprises were small with few specialists. It takes a lot of varied talents to develop new ideas, to make them work in a laboratory and to commercialize them successfully. It takes judgment to direct such a program and to avoid doing impractical things. I have heard that for every dollar spent in the research laboratory to produce an idea, 10 dollars must be spent to commercialize it. Companies which have had success in this field say that on the average 7 years are necessary to carry the average good idea to successful commercialization. So, the whole process involved in producing a profit from research is a difficult one requiring large financial means, infinite patience, great perseverance, and skilled management.

The experience of the Weyerhaeuser Company and other associated companies in the field of research and development is interesting and perhaps worth relating.

Back in 1915 the Burgess Laboratories were retained to discover profitable uses for waste materials produced by the sawmills at Cloquet, Minnesota. Out of this effort came the Wood Conversion Company in 1921, which now manufactures blanket insulation, sound-deadening materials and other products from wood fiber--but the sawmills have long since disappeared.

The difficulties involved in launching the Wood Conversion Company plus the financial problems of the depression curbed these efforts until the 1930's when a research laboratory for Weyerhaeuser's pulp division was constructed, followed by another for more basic research in 1941 under the direction of Clark Heritage. For many years I sat on a small committee which selected the projects which the Laboratory should undertake. Most of the effort over the years was to find uses for forest and mill leftovers. I was interested particularly in improving sawmill products, but usually found myself out-voted. A number of small new industries resulted from these efforts. There were also many improvements

NINE SPECIES OF HARDWOODS were included in scraps salvaged from a pile of residues for this experimental floor in an office at the Forest Products Laboratory. Strips are held in blocks by splines; the blocks are glued directly to a concrete subfloor.

in processes and products, but it would be difficult to prove a dollar return for the money and effort expended.

Perhaps the greatest dividend we have so far received from our research efforts is the realization of how little we really know and how much we have to learn. The opportunities for innovation and improvement in our business are enormous. Today we would not know how to operate without a corporate research division and technical staffs for each of our divisions. My only fear is that we are not doing enough.

One of the most interesting phases of our modern age is the accelerating rate of scientific progress and knowledge. I have heard it said that 90 percent of all technically trained people who ever lived are alive today--evidence of the vast increase of technical training and knowledge that is around us on every side. An industry which fails to improve its methods and products faces the certainty that its competitors will pass it by and that it will lose out in the race of competition.





LONG-LASTING timber bridges are the result of combining research knowledge on wood preservation, timber connectors, wood strength relationships, and structural engineering. This one is over the Umpqua River on the Umpqua National Forest, near Roseburg, Oregon.

Likewise, a country which fails to keep pace in its military preparedness or in the competitive position of its industries faces certain eclipse. The Forest Products Laboratory constitutes an invaluable aid to the forest industries in helping them to meet this challenge.

The lumberman and tree farmer need the help of research in many ways.

The efficient use of land is one of the major problems facing this country. The U. S. is said to contain 461 million acres of commercial forest land. The economic progress of those vast areas of our country which are good only for growing trees depends upon our progress in learning how to increase the forest harvest and to improve its quality. Not only the owner of the land, but also the people who live in the area, have a great financial stake in how well this is accomplished.

It is becoming increasingly evident also, that those areas devoted to the growing of trees are being continually shrunk through the building of highways, power lines, airfields, military reservations and the inroads of growing cities and towns for residential and commercial purposes. Therefore, it becomes even more important that we learn how to use to the best possible advantage those areas which are left for tree growing purposes.

Much progress has been made in recent years in learning how to combat the enemies of the forest--fire, insects, and disease. The tree farmer has learned how to harvest his forest crop in such a way as to encourage reforestation most quickly. The use of helicopters on the West Coast for scattering prepared seed rendered unpalatable to rodents and birds on newly logged land is a most important development. Other forest areas are showing similar progress in methods and techniques. I have just visited our Forestry Research Laboratory at Centralia, Washington, and have been impressed by what its personnel are doing in discovering basic facts about the forest, its protection, and its improvement. So far, research has barely scratched the surface of what remains to be learned about trees.

The integration of the lumber with the pulp and paper industries is resulting in vastly better utilization of the forest crop. Great efforts have been made to find uses for sawdust and bark of a higher economic value than for the production of power. We hope that some day a profitable chemical industry may evolve which will find more valuable uses for these waste materials. Great opportunity exists here for research and development.

One of the reasons why the lumber industry has lost its markets is because of the higher labor cost of applying lumber in construction.

Panel type products like plywood, hardboard, and sheathings of other materials than wood are cheaper to apply. If the construction market is to continue to use the products of the forest in growing volume, we must find ways of reducing the cost of application. Perhaps some new type of component panel will solve this.

Decline in the use of lumber has resulted partly from architectural changes which reduced both the floor area and the cubic volume of the average dwelling unit. This has restricted the market for all building materials. Perhaps there is little to be done about this, except insofar as we are successful in reducing the overall cost of construction.

One of the real problems with lumber has been its relative instability due to expansion and contraction under varying moisture conditions. Research to determine how water is held in wood and what can be done to remove it is progressing. Our own company is working to design new drying processes and schedules to produce higher quality wood products in less time and to approach ideal drying conditions. Also, ways to stabilize wood are being sought. These, of course, have been industry goals for many years and this Laboratory has labored long and hard at these problems.

Clearly, there is a large market for both load-bearing and non-load-bearing panels. The future for these items appears to be better than for conventional lumber, although some forms of solid wood continue to be used in these panels. Lumber siding utilizes a valuable portion of the log. Non-wood materials are competing strongly with wood siding. The lumberman has much at stake in keeping lumber in the paneling and siding field.

One of the keys is through improved bonding by developing better adhesives. This is a critical area requiring research. Lower cost adhesives and better extenders are needed. Adhesive components that will allow production of quality, medium density boards and hardboards from all wood species are necessary. We need more knowledge about what goes on during the actual wood bonding process. Work is now progressing on each of these problems in several laboratories, including our own.



SLICEWOOD, a product of FPL research, is half-inch lumber sliced without sawdust on a veneer slicer. Bin pallets (above) and curved laminated beams of red oak and decorative redwood fencing (below) have proved to be highly successful applications.



What can ultimately be marketed, not only in plywood, but also in particle boards, hardboards, fiber shapes, and laminated forms, depends upon the extent and quality of research efforts in the bonding and adhesive field.

A real opportunity exists to combine by fabrication several functions of floors, walls and roofs into one or more basic products. Structural products that insulate and protect from the elements, in addition to having load-bearing strength, have a place in future markets. Our studies show that component panels can make raw materials go farther. With a doubling of new housing starts predicted in 15 years, improved utilization of resources can help the industry maintain its share of the housing market. With competitively priced component panels, studies show that sales

THE ORIGINAL FPL system of prefabricated house construction, sandwich panels with paper honeycomb cores, is explained to a future homeowner.

income per thousand board feet of equivalent wood fiber may be increased by more than 4 times. It may be presumed that with good management, profits could be correspondingly increased.

One of the difficulties previously experienced in attempting to merchandise prefabricated housing rested in builder resistance. The home builder of today is not the home builder of 20 years ago nor are his problems the same.

A 1959 survey conducted by the National Association of Home Builders found that more than three-fourths of today's home builders build in sub-divisions--building new communities rather than single homes on scattered lots. While the typical home builder put up about 20 housing units last year, some put up so many more that the average per builder was 60 houses. Four-fifths of the houses were put up by a little over one-fifth of the builders. The bigger the builder grows the more interested he becomes in fabricating.

There has been a constantly changing relationship of material and labor costs. Twenty years ago labor costs constituted about one-third of total cost and material about two-thirds. Today, labor costs exceed those for materials. Builders are looking for ways to make any changes that will increase labor productivity. A method of home construction that reduces labor unit cost without substantially increasing material cost will probably have a greater chance of success today than it did in the past. Without any further research and development on a system of construction, our calculations show that for large builders, direct material costs and labor costs for a component house shell total about the same as for a house conventionally built, but the relationship of material costs to labor costs has been drastically changed. A real challenge is ahead of the industry to reduce the cost of component shell materials.

Most persons, I think, would agree that the cost of residential construction today is too high. Savings of labor in the manufacturing of building parts or in their assembly on the



job site must be realized. A more economical type of construction must be found and is most likely to be found in some type of component construction.

The route to success is neither short nor simple. It will not happen overnight. It involves working with builders, architects, financiers, code authorities, trade unions, private and governmental housing groups. It involves refinements in both products and processes that are essential in making economic projections. Simple and fool-proof erection systems must be developed. Builders must know which raw materials will really do the job and they must have confidence in the continued availability of these materials.

A clear picture of markets, product use requirements, and sales forecasts must be obtained. This often is overlooked. A common failing has been to assume that any new product that is developed can be sold profitably.

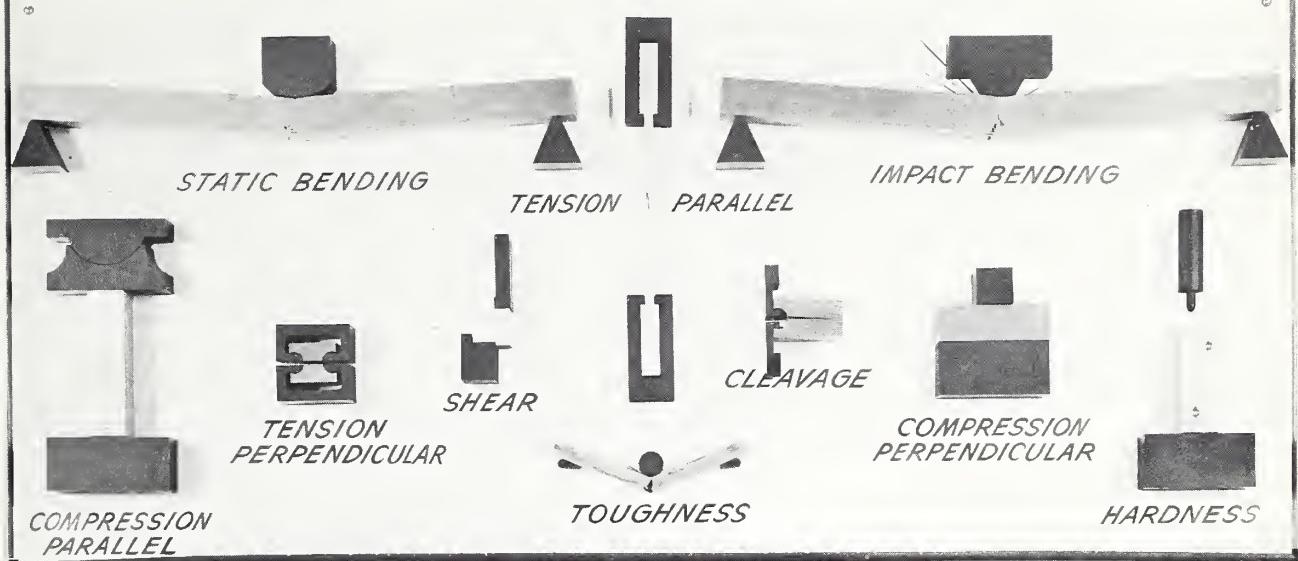
This has been a hastily sketched description of the problems confronting us in the area of products, manufacturing, and marketing.

Whether we like it or not, these problems force research and development objectives upon the lumber industry if it plans to stay in business--especially in the housing business.

Short range research objectives, we think, should be to upgrade present products, improve processes, and reduce costs. The long

EVALUATION OF WOOD STRENGTH PROPERTIES

THE KEY TO WISER STRUCTURAL USE OF WOOD



range job involves designing and creating new products to fit consumer desires--products which utilize still unused material being grown and harvested. It involves creating both products and processes to make less wood do more and make wood in general serve better. It foresees designing products and processes to utilize the changing type of wood supply. Embodied also in the long range job is the search for profitable opportunities to make products which combine wood with other raw materials.

In the past there has been a tendency to think of our industry as being built upon a single resource--wood. I am confident that when the technology of the lumber industry reaches the same level as that in the chemical and electronics industries, its research men and facilities will be considered as a resource of equal or perhaps greater importance than the wood supply itself.

Nature has done well by the lumber industry. The industry has in turn well served the country by providing jobs and continual flow of useful products that have contributed to a rising standard of living. To date this has been largely achieved without a substantial investment in research.

This cannot continue. Competitive economic forces have drastically changed market demands and market conditions. There must be a growing realization in the lumber industry that what nature has done well, we must learn through research to do better.

The Forest Products Laboratory was dedicated 50 years ago to these ends. For half a century it has served well the industry and the nation's forest resources. It has been a mainspring for the development of wood technology. The constructive impact of its work has been unique in the field of industry-government relations. Many of the leaders in forest industry research today received their early training at Madison or have spent considerable periods of time here.

For those now associated with the Laboratory and for those who will be associated here in the coming years, the job ahead is certain to be challenging and of even greater importance than in the past. Without question, research will be a powerful factor in the future of the lumber industry.

Its bounds will not be set so much by the ability of men to produce wood as by their ability to produce useful ideas.

Forest Products Research and the PLYWOOD INDUSTRY

**W. E. DIFFORD, Executive Vice President
Douglas Fir Plywood Association
Tacoma, Washington**



EVALUATING EXTERIOR PLYWOOD manufacturing variables on the Forest Products Laboratory exposure fence at Madison.

It is a pleasure to come before you today, but my pleasure in being here is mixed with awe in the presence of so much outstanding scientific talent. It makes me feel a bit like a fish out of water. That's because I am essentially a salesman. Now, as the man who has steered our association's promotional effort for the past 22 years, I am, frankly quite proud of the contribution I believe our association has made to the tremendous growth and expansion of the plywood industry during that period. However, as a salesman, I am the first to admit that we would have been helpless without research. In fact, regardless of our promotional capabilities, it would not be an understatement to say that without the fountain of research results accomplished by this laboratory here in Madison over the past 50 years, plywood would not enjoy half the markets it has won today. We might very well be no further along than we were 20 years ago.

It would be most appropriate on this occasion to review some of the areas in which FPL has made substantial contributions to our well-being as an industry. Ever since its inception, FPL has been building its knowledge of basic

strength data on every species native to the United States. This information--without which no plywood could be marketed for engineered structural applications--has always been available, and it has been a basic factor in our own progress. I can't emphasize this too strongly.

My first contact with the laboratory in 1938 is a good example of how research can provide the answer to potential marketing and utilization problems. Back in 1938, when the plywood industry began to come out of the depression doldrums, we were buying virtually all of the old growth fir timber for peeler.

It was obvious at the time that if plywood demand were to expand very substantially, the results could well cause depletion of our resources in fir and a run-up in peeler prices which would have a potentially dangerous effect on production costs and consequently our market position. This has occurred.

This was only a potential sales problem at the time but we set out to find the answer should the situation arise. Our own staff came

up with the suggestion that hemlock, although it had some drawbacks, was available in wide quantities and could act as a supplemental source of supply to the plywood industry.

However, we learned very shortly through our contacts with Cap Winslow, the director of the laboratory at that time, that there was no money available for the research necessary to establish the structural values of this species. As a result of this, we persuaded our board of directors to support a proposed research program in this direction with an expenditure of \$10,000.

This wasn't easy. At that time there was no demand for hemlock, and its structural capabilities were very doubtful. However, World War II produced an insatiable demand for plywood and the only supplement to fir was the manufacture of plywood from hemlock. As a direct result of the laboratory's research, hemlock was accepted by every government agency with an interest in this area, and some mills that would otherwise have had to cut back on their production were able to keep running on a full three-shift basis with hemlock logs.

This episode made two things clear. First, the ability of the laboratory to come up with answers to essential problems was limited by the funds congress was willing to appropriate. Second, given adequate funds, it was clear that FPL could make a basic continuing contribution to more efficient utilization of our timber resources. Since then, FPL has done a great deal more work along the same lines and today we are using for plywood, as a result, species that 20 years ago would have been ignored as valueless.

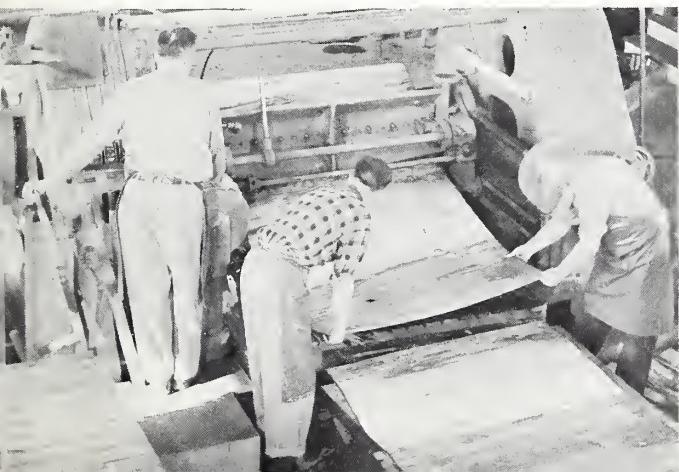
Within just the past year, we have had in the plywood industry another example of the great

value of FPL's work in this area. In recent years, it has become more and more necessary for many of the plywood manufacturers to utilize softwood species other than fir in their operations. As a result it became necessary to classify the various softwood species in relation to Douglas-fir. FPL was ready with the basic information in this case, and we were able to set up a new classification plan for the softwood species in the Northwest. This became the basis for revising the Commercial Standard for softwood plywood. As a direct result of FPL's work, it was possible to get this new grouping and the accompanying strength values accepted by FHA and other organizations influencing the market for plywood. All of this involved months of study and planning. The net result for the plywood manufacturer has been important and substantial. They are now able to market much of the plywood manufactured from species other than fir on a logical basis. Without Madison's work, we would have had chaotic conditions which would inevitably have been disastrous in terms of plywood's acceptance in major markets.

Now, Madison has proposed a new study based on comprehensive increment borings to determine the density of each important western softwood species. This would require careful selection of trees truly representative of the species' density and structural testing of such material. It will also require the cooperation and support--both moral and financial--of the producers. We believe this is a highly creative move. We endorse the project wholeheartedly and we have done and will do everything we can to bring it to fruition.

While we have absolutely no quarrel with the stress values in use today, some of our customers are raising questions. There are elements in the construction industry which are insisting that previous studies are not adequate because of the limited sampling used years ago. They say there is reason to believe present stress values are too conservative and that they are resulting in over-design creating unnecessary roadblocks in the market.

VENEER-CUTTING RESEARCH at the Laboratory, coupled with gluing, nailing, and strength evaluations, established acceptable grades of white-pocket Douglas-fir plywood.





WHITE-POCKET Douglas-fir plywood makes a unique, decorative paneling in an FPL office.

Regardless of the validity or lack of it in these claims, the program proposed by FPL would lead to a highly accurate assessment of the true capabilities of wood building products manufactured from the various Northwest species. Much other data of real value to timber owners and producers would emerge from the program. We believe that FPL is ideally equipped to set up the program. I can assure you that our association is supporting these proposals in every way that we can.

Another one of the truly significant developments in research leading toward greater utilization of our timber resources in recent years was the research completed by the Forest Products Laboratory on white pocket veneer. This program was initiated by Douglas Fir Plywood Association in cooperation with Forest Products Laboratory. The results of this joint effort have made it possible to utilize millions of feet of timber in plywood without any sacrifice of structural quality. Prior to this research, the uncontrolled utilization of white pocket in plywood was killing off a significant segment of the plywood industry's market. This again represents an area of research the laboratory is ideally equipped to handle.

It might be appropriate on this occasion to recall to you some of the early work of the Forest Products Laboratory in plywood construction. The laboratory's basic research in these areas has been the incubator of a whole new industry and it was the forerunner of the major trends present in today's construction methods.

For example, it was the laboratory's work in stressed plywood skins for airplane wings in the early years which subsequently suggested to us and others the possibility of plywood box beams which are commonplace now in the construction field. It is perhaps even more significant that the laboratory erected here at Madison in 1935 the first stressed skin panel house. Out of this imaginative project came the basis for the prefabricated home industry. Subsequent developments in components which now bid fair to revolutionize light construction practice evolved from the same source. Today we are developing plywood box beams in various shapes, stressed skin panels for folded plates in what we call space planes, plywood vaults, and other revolutionary building shapes. Our ability to enter a whole new area of engineering design grows out of the basic data Forest Products Laboratory developed. This has been the foundation for most of the work our own laboratories have accomplished during the past 20 years. Some of that has had a most dramatic effect upon the market place, and it evidences the direct relation between FPL's research effort and growing markets.

I believe it was in 1936 that Forest Products Laboratory first published its results on racking tests on fir plywood. These were widely used to build acceptance of plywood sheathing which produced a substantially more rigid structure than the conventional methods of sheathing at that time. But far more significant than the use made of these findings by our early promotion men were the further developments of that work.

In effect, these early findings by Forest Products Laboratory were the ovum from which has grown a wholly new series of design methods all of them growing out of FPL's data on plywood's resistance to shear. The first big era of growth occurred when our own laboratory ran a series of model and full-scale tests on the action of plywood when it was engineered as a roof diaphragm. The results of two years of original research in this area produced an accurate design method that made it possible to use plywood for roof decking for the first time in areas characterized by dangerously high winds and earthquakes. Prior to the time this research was

FUNDAMENTAL ASPECTS of the veneer-cutting process are studied by means of highspeed photography at the Forest Products Laboratory.

completed, buildings in areas of this type relied on empirical methods to meet the problem. With the development of a design method for plywood, it became possible to utilize a plywood roof as a lateral stiffening member in a structure. Within twelve months after this research we found that more than one-third of all of the larger wood buildings in the San Francisco Bay area were utilizing a plywood roof deck. It was this research which opened the door to volume plywood uses in buildings other than homes.

The diaphragm research has subsequently served as the foundation for the development of the wood folded plate. This engineering technique makes it possible to reduce the cost of a roof structure considerably and to eliminate many of the otherwise necessary interior supports in a building.

All this in turn is now giving rise to what our engineers call the "Space plane." Under this approach to engineering design, we are getting actual buildings with fresh and imaginative shapes.

Again, I can't emphasize strongly enough the key role in these developments which has been played by the Forest Products Laboratory. It has been the fountainhead of the basic scientific data on which we and others have been able to build. There is practically no area of our laboratory work which is not based directly or indirectly on the creative and pioneering program of this laboratory here at Madison. We continue to be even more heavily dependent upon other aspects of Madison's work--for example, the investigations in adhesives, pressure treating, and the combination of wood with other materials such as plastics and light metals.

Undoubtedly, FPL's work has been equally valuable to areas of the wood using industries other than plywood. Nevertheless, even since Cap Winslow confessed a shortage of funds to me in 1938, it has been obvious that the laboratory has been severely limited by available appropriations. It has been apparent from time to time that there are congressmen with little interest in this area. Some



of them have been so short-sighted they have flatly stated that they would just as soon see the laboratory shut down.

Nothing could be more disastrous. As a result of apathy in Washington and in and out of our own industry, we have had a trickle of technological innovation where we might have had a flood. Although the plywood industry has grown spectacularly over the past two decades, the lumber industry is fighting for its very life. The time may come when plywood could be in the same position. It is obvious we cannot survive as a healthy and important industry in the half century ahead unless we can go to market with wood in new forms, in new combinations, and with new properties.



DURABLE EXTERIOR PLYWOOD makes possible unusual new architectural forms, such as these curved roof panels.

To accomplish this we need to launch a massive effort in pure and applied research. We need a basic purposeful digging into the unknown. We need a more thorough understanding of the real nature of the tree. On the one hand, our timber resources, the only truly renewable resource available to man, could prove to be with the right kind of technological innovation, the source of a giant new industry manufacturing products in the still undeveloped field of sylva-chemistry. The first step is pure research.

In the area of applied research there are immediate problem areas. The achievement of true dimensional stability is essential to further progress in the market place. At the same time, our long-time survival in the construction market against such competition as aluminum and plastics requires wood products with greater resistance to fire, rot and insects. Despite much progress, the art of gluing remains in a relatively primitive state.

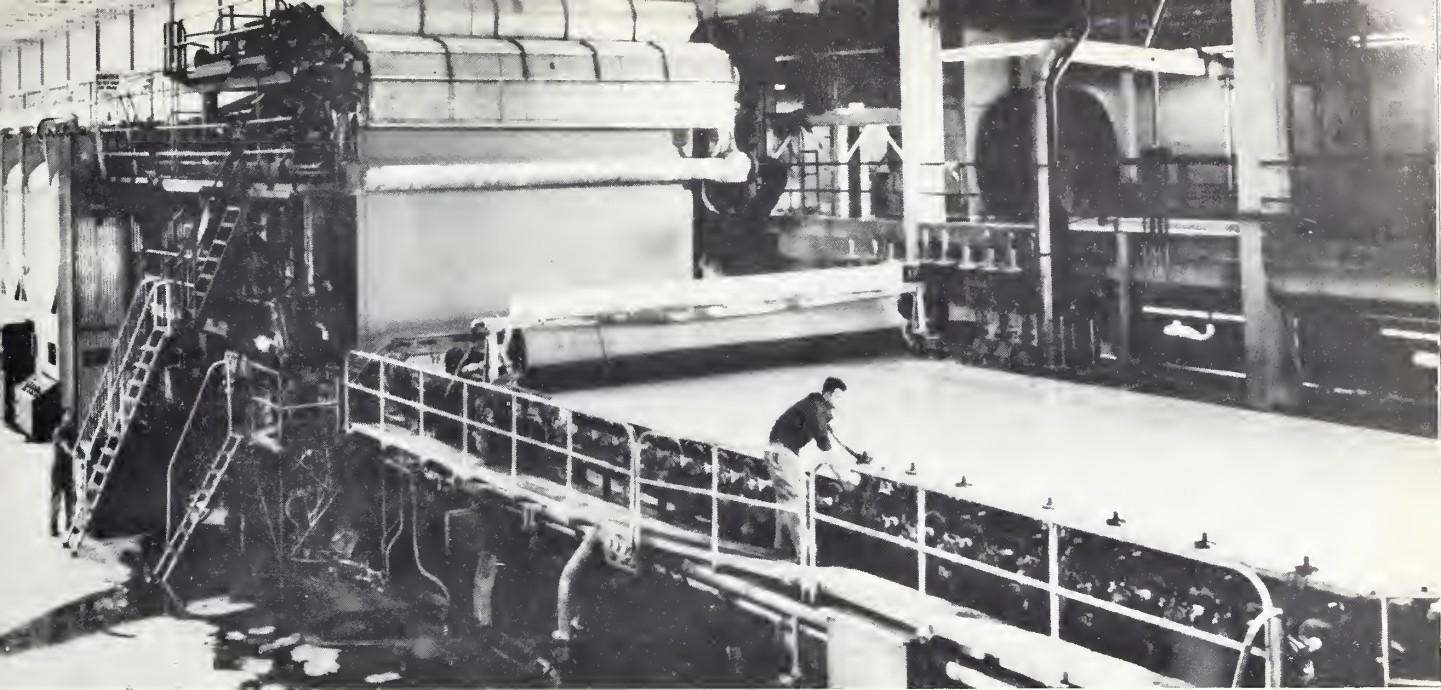
Some of the privately held companies have done a great deal with their own research programs. Often these have been fruitful. However, I do not believe that it is any reflection on private industry to say that the research our industry really needs today is bigger than any one of us can handle. Now what's the answer?

Perhaps we can find a clue by looking outside our business. Only recently BUSINESS WEEK pointed out in a major article that the field of semi-conductors or transistors is now the dominating force in the \$10 billion electronic industry. Presently it is growing twice as

fast as any other element. The fantastic growth of this segment of the electronic industry is a classic example of the growth which can be fired up through true technological innovation. The magazine points out that the semi-conductor industry has a unique distinction in the way in which it grew. Despite the multiplicity of companies in this field, the technical knowhow for all its strides in the past ten years came basically from the same single source--MOTHER BELL'S COOKBOOK. This is trade jargon for the basic findings of Bell Laboratories on transistors. All of these findings were made readily accessible to outsiders and many individual companies were able to add to or refine Mother Bell's recipes and make a lot of money fast from improvements. As a result, today's most promising industry grew out of one basic research effort.

Now we don't have a Mother Bell in our business, but we DO have a Mother Madison. And there is a striking parallel between the way in which some elements of our industry have capitalized on Mother Madison's recipes and the way in which the semi-conductor industry grew out of Bell's work. I sincerely believe that Forest Products Laboratory has the creative capacity to write a new series of technological recipes that could spark even more spectacular progress in wood utilization. The problem is public support. I challenge all of you, all the elements of the forest products industry, to join hands in support of our laboratory. Let's work as a united team for adequate appropriations for this research. Because of public ownership of timber in this country, the public's stake in efficient utilization of this precious resource is even greater than our own. I believe that if we can work together to dramatize the need, it will be possible to persuade Congress to give Madison the support it must have in this effort. With this support, Mother Madison can write the recipes that might well produce technological innovation and growth in the next 50 years beyond anything it is possible for us to visualize today.

Again, I challenge all of you to examine the highly suggestive example of Mother Bell's Cookbook. Again, I say, let's join hands to get the funds FPL needs to write a new set of technological recipes for a Mother Madison's Cookbook on which we can build for the next fifty years.



Forest Products Research and the PAPER INDUSTRY

H. E. WHITAKER, Chairman of the Board
The Mead Corporation
Dayton, Ohio

Most of us in this room are fully aware of the important part that the paper industry plays in our daily life, providing the many hundreds of services throughout all our activities: In trade and business, in leisure and our lives at home. The variety of its forms and the number of uses to which we put it is endless. The rate of use of paper, usually expressed in terms of pounds per capita, has often been referred to as an index of the degree of civilization.

Perhaps it is. I don't know. There is a striking contrast throughout the world in the amount of paper used in the different countries and on various continents. The highest rate of use is in the United States, of course; but whether that means we are the most civilized may be open to some argument. At least it is a sign of abundant material prosperity.

This great use of paper has developed as a result of a certain kind of research--the driving force of business to find new markets, the enterprise of discovery in finding new ways to do things, new needs to make life better. And, of course, to make money.

The classical definition of Research is limited to the scientific approach, the diligent study of phenomena in the laboratory to uncover laws of nature, the whys and wherefores of things. Then, as industry moved in on the fields of the universities over the past 50 years, the definition of research was stretched somewhat to include the application of the findings, the development of practical uses. Because business was footing the bill, practical results were demanded, and the departments of "Research and Development" were given specific projects to work on, definite goals of

inquiry. Now, as the wheel turns, we are coming back to the conception that a certain amount of what is called "Basic Research" is in order. And when we say "Basic," we all mean a sort of experimental wandering around among the raw materials and building blocks we use, to see what turns up. Not exactly blind groping, because a scientist always knows what he is doing. But a freedom from pressure to produce any particular planned result.

Few companies do very much of this basic research. Perhaps 2 to 5 percent of the research budget is devoted to it, as a sort of gamble. But stockholders, and management generally, are constantly demanding results. Research, they say, must be "productive," and the pressure goes on for answers that will increase earnings.

When it comes to our other areas, to which we have applied the term "Research," we can put forward some pretty strong arguments. Take "Market Research," for instance. Certainly we can justify searching studies of consumer demands. Sales are what makes the mare go, and anything that might improve sales is o.k.

Then, there is Research in personnel work, even psychological studies of employee attitudes. Research in statistical control and linear programming, research in forestry, almost every activity and function of the business. Even "Operations Research," so-called.

And, of course, research in New Products which is the latest phase of the expanding business world. The boast of one company after another--and it is quite true, that a large part of their product line consists of products which did not even exist ten years ago, but developed through Research.

Research, the word itself, simply means "to search anew." And you can search anew in every field. So it is not quite fair to say that business has corrupted the word "Research." It isn't necessarily limited to science and the laboratory.

We are here today to talk primarily about scientific research, and more particularly, forest products research and its possible future influence on the paper industry. In ex-

ploring the fields of opportunity, we who have spent our working lives in this industry are constantly amazed at the variety of problems unsolved, and the fascinating challenge that they present.

For example, let's take the forest itself, the abundance that nature presents. We think we already know a lot about trees, the various species and their characteristics, the rate of growth, effect of soil conditions and climate, all the environmental factors, spacing and sun and all the rest. We are beginning to know more about bugs and disease and how to control them. We are just beginning to discover something about genetics and the complexities of individual strains in particular types of trees.

When you come right down to it, all of this knowledge is still very much a collection of data--facts, if you like; but when it comes to control and utilization for maximum results, we run into the real difficulty, the "why" of these facts. When we learn the underlying laws, then only will we be able to proceed to use our lands to best advantage, to grow trees like we grow corn in Iowa, straight and tall, all with the same uniform height and spacing for maximum output per acre. There are a few such plots of trees in America today, but very few. Perhaps in 50 years our production timberlands will look like giant corn-fields.

When we take a tree to the paper mill, we cut it up in little pieces, throw half of it away, and just take the convenient sized pulpwood logs to the plant. What a waste of good material! Why not chew up the whole thing on the spot, branches, twigs, and all, and make use of it, 100 percent?

When we get the logs to the mill, we chop them up into fine chips, cook them with strong liquor, then throw away the rich wood chemicals which nature provided in the original tree. For every ton of fibre we use in making paper, another ton of chemical complex is lost. Certainly we should be able to improve on this process that was started 100 years ago. In the next 50 years, we want Research to show us how to convert all of the wood into useful products, lignin and all. Perhaps we will eventually put the whole tree into solution, cellulose fibre as well, then split it by distillation or some other means into one hundred or more separate products; including an

artificial fibre, to be respun out of one of the components, a fibre of reasonably uniform characteristics which will not give us so many headaches as the present fibres do in making paper.

Now I know there are many other good things to do with trees, besides making paper out of them; but, of course, paper is my business and naturally I see paper first, when I look at a tree. But I often wonder if our paper mills could not make much more money out of the so-called by-products of the tree than they ever did out of the paper.

The paper industry is fast getting mixed up with the plastic and resin industry. We substitute for each other's products, we combine them and mix them, and all sorts of new things are coming up in the years ahead. One outstanding advantage that plastics have, as against cellulose fibres, is uniformity. Research can help us to control the uniformity of the cellulose fibre we produce to a certain degree, and I predict that eventual solution of this problem involves a synthetic fibre, a reconstructed cellulose fibre of standard dimensions and standard properties. When? Maybe in 30 years or so--maybe sooner.

While I am convinced that the forests and natural cellulose will be the main raw material for paper and paper products for many generations to come, I doubt that our pulp mills and paper machines will continue long in the form as we know them today. It does not take much imagination to conceive of a pulp mill as an entirely automatic, continuous process, something like an oil refinery today.

The paper machines--well, they haven't changed much since the first one was invented back in 1800. They just become bigger and more complicated and more expensive. Surely there must be a better way to weave fibres together into a continuous sheet. Perhaps we have devoted too much emphasis on chemistry, and have neglected the field of physics and mechanical design in our industry.

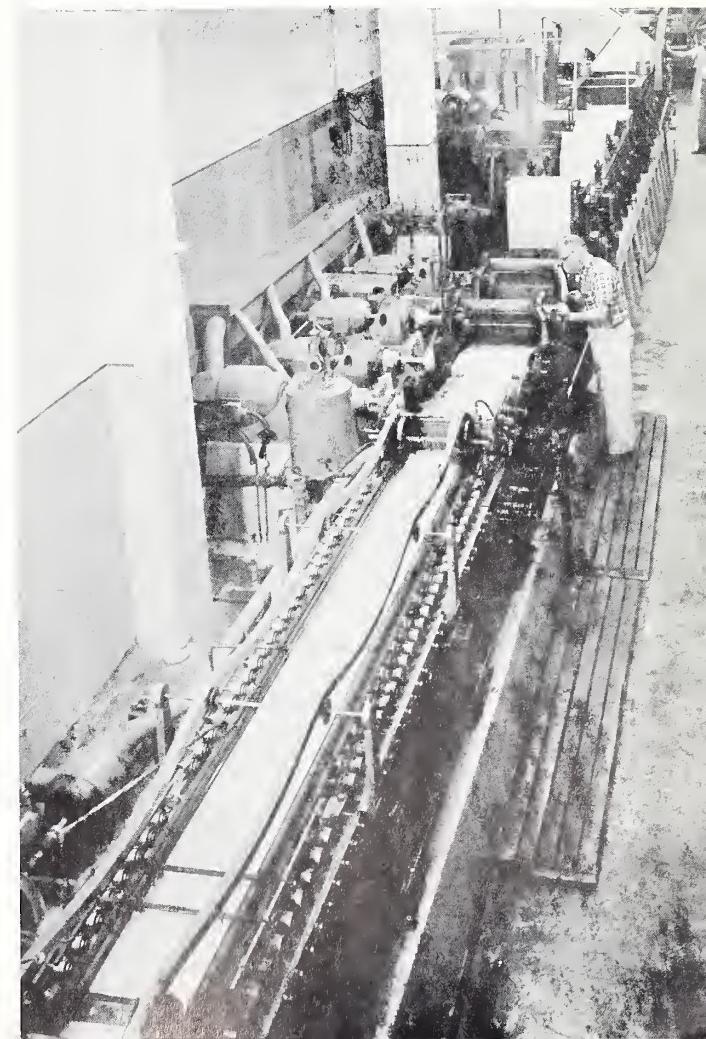
The development of the electrical transistor, and the whole marvelous conception of miniaturized instruments and controls which ride in our satellites today is a shining example of what research and imagination can accomplish. The point is that it takes more than

just chemistry or physics, but also a highly developed skill in mechanics to produce the final results.

What does this have to do with forest products research? Simply that mechanical design and imagination are very definitely a part of the picture and necessary to successful accomplishment. I think that the management of the paper industry, in developing their research teams, would do well to consider this carefully.

The future in forest products research offers a world of fascinating prospects. The young men who will accomplish many of these changes are living today, at work in our laboratories, and are numbered among the students in our technical schools. Fifty years from now at another anniversary meeting, they will look back and laugh at the way we make pulp and paper today.

SMALL-SCALE Papermaking Machine, complete with all necessary accessories, in the FPL's Division of Pulp and Paper. Various characteristics of experimental pulp furnishes are evaluated accurately in finished-product form.



The Stubborn Genii

SAMUEL LENHER, Vice President
E.I. du Pont de Nemours & Co.
Wilmington, Delaware

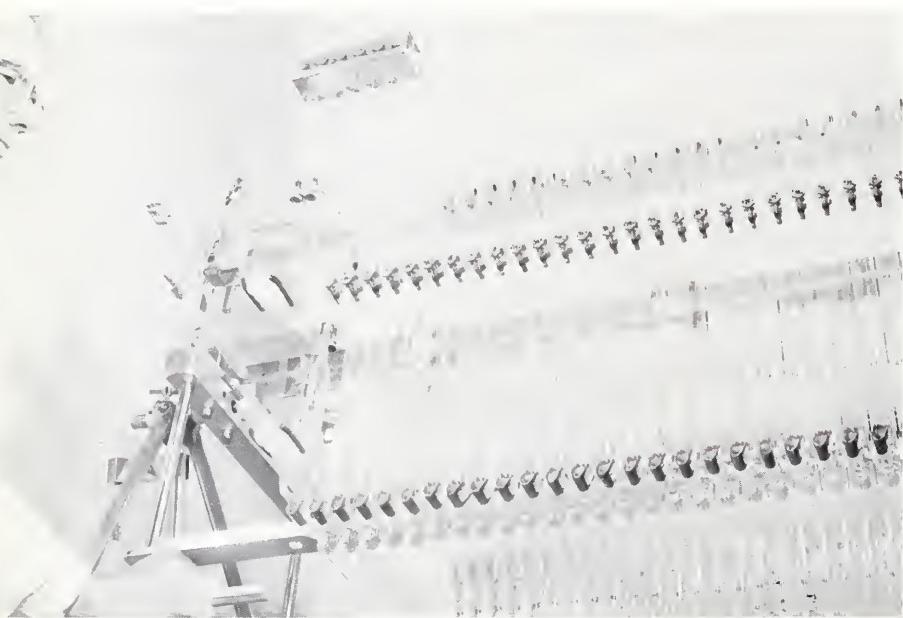
The invitation to join you in commemorating the fiftieth anniversary of the Forest Products Laboratory has given me the pleasant task of reviewing the mutual progress of the chemical and forest products industries. Examining the past accomplishments of these industries, and contemplating the prospects for the future, we are led to one observation that is especially pertinent.

All of us are well aware of the interdependence of our industries. Chemical and forest products companies use each other's materials in so many ways that a gain for one almost inevitably becomes a gain for the other. Perhaps not as widely recognized, but certainly equal in importance, is the technical interdependence which derives from the diversity of institutions sponsoring research in this field.

There are three major organizations sponsoring scientific research and engineering in this country: Government, industry, and academic institutions. ("Academic," in its broad sense, includes private research foundations as well as colleges and universities.) Each of these three has a different rationale, and thus its own outlook on technical work. Each makes a unique contribution. Each supplements and enriches the work of the others.

The government-financed laboratory, guided by precepts of national need, can undertake projects beyond the reach or facilities of most private organizations.

The industrial corporation can muster the resources needed for a determined assault upon problems within its field of interest, and



AN FPL CHEMIST separates minute quantities of extractive wood chemicals by counter-current distribution in a Craig apparatus.

translate laboratory discoveries into useful, widely available products.

The academic institution, dedicated to teaching and to the extension of human knowledge, can devote its primary research efforts to problems of a fundamental nature, expanding the intellectual fund from which all research and engineering draws.

To some extent, of course, the work of these institutions overlaps. Many universities operate field stations comparable to those sponsored by the federal government. Many corporations pursue fundamental studies with some of the academic detachment of a university. On many occasions, government research has produced discoveries of value to industry. However, the basic distinctions remain. For proof, one need only try to imagine the crisis we would face if any one of the three types of institutions were suddenly to close its doors. Science is a useful friend for mankind but, like any friend, it can be stubborn. It offers the full measure of its help only if it is encouraged by all of the institutions qualified to fill the role of sponsor.

I can think of no area of research in which this diversity of sponsorship, this process of mutual enrichment, is more obviously a factor than in the chemical and forest products industries. Each industry can take pride in many research advances, but it is wise to remember that, in science, each of us is a debtor as well as a creditor.

A thorough review of the contributions these industries have made to each other is beyond the range of this assignment. However, I would like to outline some of our areas of mutual dependency, and suggest some problems chemical research may help solve.

Any such listing logically begins with the chemical industry's use of wood pulp as a basic raw material. Cellulose has been in use for such a long time, in so many products, that its importance requires little in the way

of documentation. Suffice it to say that it is a base material for a number of films, explosives, coated fabrics, lacquers, man-made fibers, and plastics, all of which are major, volume production lines of the chemical industry.

Another important raw material is tall oil, produced from pine wood in the manufacture of sulfate pulp. It provides a classic illustration of the value of multiple sponsorship of research. Once a waste product which presented serious pollution problems to the paper industry, tall oil has become a respected citizen of the industrial world through research by the Forest Products Laboratory, by paper manufacturers, and by chemical firms.

Tall oil production has almost quadrupled in the past twelve years. A current bibliography lists nearly seventeen hundred technical papers on this versatile material, and cites thirty-two product lines in which tall oil or its derivatives are used. Most of the thirty-two are products of the chemical industry.

Lignin derivatives, sulfides, several acids, and a number of other chemicals derived from forest products are being used or investigated



A VARIETY OF CHEMICALS, worth some \$60 million annually, are now being derived from wood as a result of research. A continuing, renewable resource of chemical raw materials, wood is on the threshold of becoming a primary source of chemical intermediates.



BACKYARD BARBECUING has boomed the market for charcoal, a good outlet for wood residues and low-grade or cull trees. Chemicals can also be recovered during carbonization in large-scale operations.

by the chemical industry. In some cases, it is too early to tell how economically significant they may be; but to say the least, we are much interested in their possibilities.

The contributions of chemical research to the forest products industries follow much the same pattern. Some are "old line" developments which have become an everyday part of the processing and utilization of wood and wood products; some are recent developments which have found a few applications and hopefully will find more in the future; some are discoveries of such recent origin that one can only guess at their long-range implications.

With no suggestion of chronology or order of importance, here are four such contributions: The development of finishes and preservatives for wood and wood products; the creation of improved materials for bleaching, dyeing, sizing, and stabilizing paper; the development, largely through polymer research, of adhesives and binders used in laminates, sandwich panels, and impregnated wood materials; and the partial control through chemical means of weeds, fungi, insects, and other forest pests.

The last of these warrants special comment. To date, chemical control of insects, weeds, and plant diseases has been more effective in food and forage crops than in forestry. It is not that trees present insuperable biochemical problems; but they are bulky and slow-growing. They tend to be expensive to treat, and it takes years to test thoroughly

the experimental materials applied to them. Moreover, as in agriculture generally, there is the matter of ecology. Biologically active materials must be used with judicious reference to the effects they will have not only on the plant in question, but also on the many animal or other plant species in the environment. Research in this field thus proceeds at a pace that hardly invites spectacular headlines.

Nevertheless, progress is being made. Weed-killing chemicals are being used to remove or retard undesirable species which compete with valued forest trees, and to control parasitic plants. Insecticides have saved millions of acres of forest land from destruction. Growth-promoting chemicals are being tested for possible use in improving the vigor of seedlings, and may lead to chemicals which will strengthen root systems and thereby improve drought resistance of young trees.

Seed-treatment chemicals have proved effective in protecting some species against natural enemies. This development, incidentally, is another of those text-book cases proving the efficacy of multiple sponsorship in research. In 1902, a chemical called thiram was discovered, I believe in a European university. It was first used to promote cross-linking of molecules in rubber. Du Pont chemists found that it exhibited marked biological activity. With fellow scientists at a number of government and university experiment stations, and in lumber companies, they determined that thiram plus an insecticide protects the seed of certain trees and farm crops. As one result, the forest products industry now has a satisfactory, low-cost way of seeding forest land from the air, without fear that the seed will fall prey to fungi, rodents, birds, or insects.

Looking to the future, which admittedly is a dangerous game for anyone in science, there are two particular areas of chemical research which bear watching for their implications here. First, we nourish a dream that studies of energy flow in plants may lead to synthetic chemicals which will stimulate photosynthesis. Ultimately, it might be possible to control the growth rate of trees, or alter the end products of photosynthesis in such a manner as to make trees produce more cellulose and less lignin. To an industry which has long

found problems in using lignin, this would doubtless be a blessing.

Second, a group of four scientists has duplicated in a test tube the reaction nature uses to create the nitrogen compounds essential to life. It has long been known that some bacteria are able to take nitrogen from the atmosphere, where of course it is available in limitless quantities, and convert it into the forms needed to sustain plant life. However, until now man has been unable to duplicate nature's reaction. Chemists could bring about the conversion only by brute force, using extremes of temperature and pressure. With this newly discovered procedure, the enzymes responsible for nitrogen fixation can be extracted from bacteria and made to perform their function in the same manner as in the living cell. At long last, science has a technique for studying, under controlled, duplicable conditions, one of the most fundamental of biological processes.

No one yet knows what the discovery of this technique may mean, but it encourages optimism. It suggests the possibility that man may be able to find or synthesize a chemical to speed up the rate with which living organisms fix atmospheric nitrogen, and thus make plants grow more efficiently. If that hope proves fanciful, at least we will have learned something about one of nature's most tantalizing mysteries, and will have taken an im-

portant step toward understanding life processes.

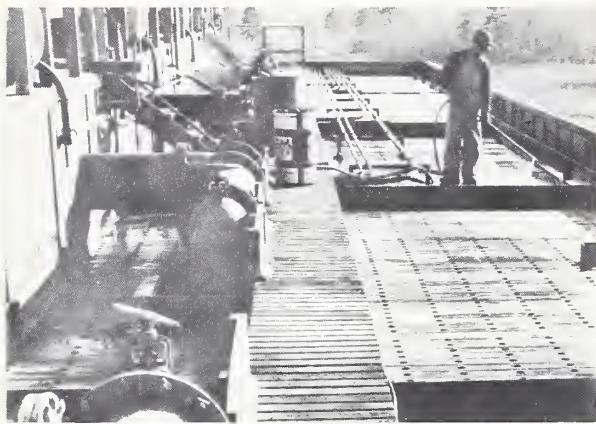
If you will pardon one note of local and personal pride, I might add that the scientists responsible for this feat work at Du Pont, and were backed in their effort by studies at the University of Wisconsin.

In due conscience, though, we must match our optimism with humility, and confess that many of the central problems of the chemical and forest products industries remain unsolved. It is estimated that 80 million forest acres are now at low or medium productivity; we are much in want of an economical means of upgrading their output. The battle against insects and disease is far from over--if anything, the losses here are probably growing rather than declining.

Still needed are economical, fully practical ways to make wood dimensionally stable, fire-proof, and resistant to deterioration. Still needed are specific materials to control the growth patterns and perhaps the heredity of trees; ways to use forest products materials now largely wasted; ways to provide trees with immunity in infancy, as it were, through the introduction of systemic chemicals; ways to make use of the many plant species for which economic applications have eluded us. At the moment, only a fraction of one per cent of known plant species are of economic



WOOD SOAKED in polyethylene glycol, somewhat similar to that used in car radiators in winter, won't shrink or swell. This high-value walnut gunstock will retain its desired dimensions permanently.



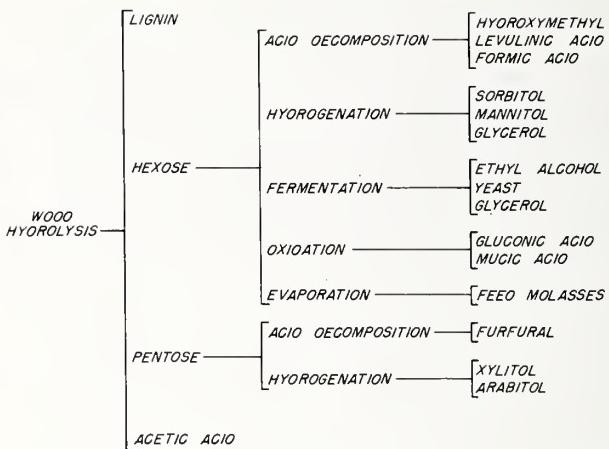
APPLYING PRESERVATIVE CHEMICALS to a huge redwood cooling tower by the double-diffusion process, originally developed at the FPL as an on-farm treatment for fenceposts.

utility to man. Lack of basic biochemical information sharply limits our efficiency in using even that fraction of a percent.

I do not suggest that the chemical industry can solve any of these problems by itself. Rather, I suggest that such gains as we record will supplement, and in turn be supplemented by, research in other types of institutions.

Science is a very stubborn genii. Despite the proliferation of disciplines and subdisciplines, science remains essentially indivisible. We may fractionate it for our own convenience, but more and more frequently we find it necessary to break through whatever partitions we erect.

Despite our most carefully laid plans and the infusion of impressive sums of money,



VARIOUS REACTIONS by which basic constituents of wood can be separated and processed to industrial chemicals.

science refuses to comply with any preconceived notions of which scientist or which laboratory shall be permitted to take the next big step forward.

This wonderful genii is a most orderly and logical intellectual companion for man, but it refuses to focus its loyalty upon any single group of practitioners. It thrives best when it has many masters. It has shown many times that its strength is greatest when its sponsors are the most numerous and diverse. When we consider the problems facing the industries and organizations represented at this anniversary, it is clear that we must keep the genii at its tasks in all of the institutions with a stake in the results. Only in this way can industry, government, and the academic world advance the cause of science within their own spheres, and make full use of its potential for human progress.

The original Forest Products Laboratory building; 1910 - 1932





wanson Difford Lenker Weyerhaeuser Mead

Nelson

Locke

Whitaker

Price

Hannahan

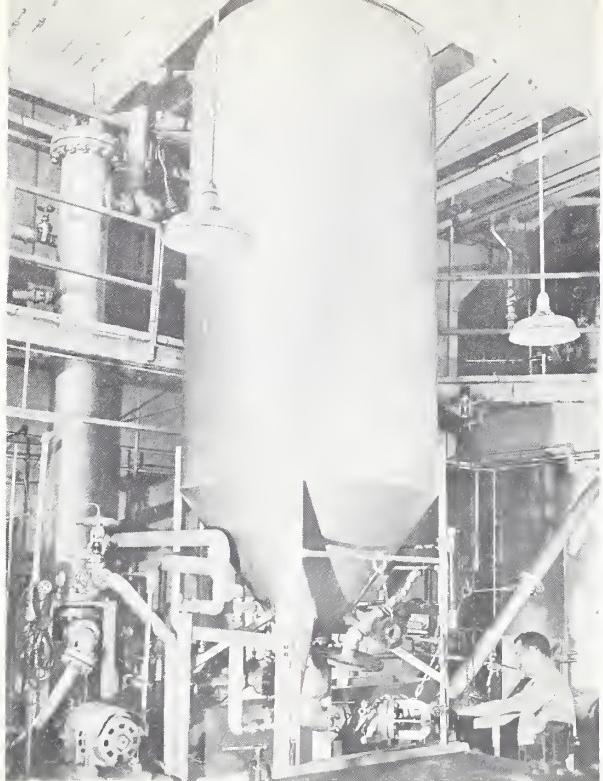
Introductory Remarks at the

Golden Anniversary Governor's Luncheon

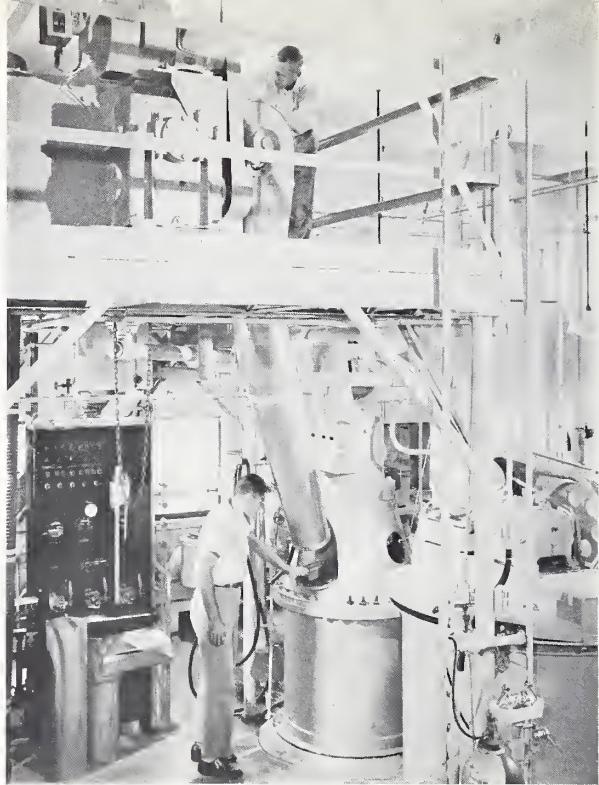
STANTON W. MEAD, President
Consolidated Water Power and Paper Co.
Wisconsin Rapids, Wisconsin

I appear on your program this noon as a third man associated in the paper and pulp industry. At this morning's Assembly you heard Mr. Weyerhaeuser who is President of Weyerhaeuser Company of Tacoma, Washington, and who until recently was Chairman of the Board of Northwest Paper Company at Cloquet, Minnesota. And you also heard Mr. Whitaker who in addition to being President of American Paper and Pulp Association is Chairman of the Board of Mead Corporation of Dayton, Ohio and also is Chairman of the Board of Brunswick Pulp and Paper Co. of Brunswick, Georgia. I come from Wisconsin Rapids, Wisconsin where we have the main office of our company, which operates five pulp and paper mills in Wisconsin. Thus it happens that three of us represent the national character of the pulp and paper industry, from coast to coast and from North to South, with me being the local representative and a resident of the State wherein your Golden Anniversary is being held. Our industry relies heavily

on the forests for our basic raw material, cellulose fibre. The Division of Pulp and Paper in our Forest Products Laboratory has constituted a principle segment of its research and activities during its 50 years of service. Its contribution to the industry in developing improved techniques and in pioneering new processes has enabled us to attain higher efficiencies, to improve the character of our products for their better usefulness, to introduce the use of papers and pulps in a wide variety of new applications, and to make serviceable pulp fibres out of every species of tree than grows. I believe I am correct in that last statement which is that we now have sufficient understanding in pulping processes to make it possible to derive refined wood pulp from any species of tree which Nature provides. Of course the old saying that "you can't make a silk purse out of a pig's ear" still holds. The selection of wood species and the choice of pulping methods are governed by the requirements which the pulp must



IN THE SEMICHEMICAL process, chips are digested . . .



pulp is bleached to the required brightness . . .

satisfy. Hence we find great diversity in wood supplies and pulping systems at individual mills. Sometimes under unusual circumstances a mill has to compromise in its preferred choice and resort to less desirable selections. Once during World War II when pulpwood was so desperately scarce and price ceilings added to the difficulty I was pressing our supervisor for more wood and he asked what we were willing to take. I said almost anything. Then he said, "So long then as it is wooden wood you will buy it?" Of course, that was a joke but the fact that the thought was even expressed indicates what is possible in a distressed market.

I would like to dwell one more minute on this available diversification of wood fibre. This fibre varies in length, thickness, and strength, in color and in brightness, in cleanliness, in opacity, in bulk, absorbency, and texture when formed as paper or board, and in response to treatment by beaters and refiners. One of the special arts of the papermaker is in choosing the fibre furnishes for the grades he must make or in choosing marketable grades for the pulps he must use. The Division of Pulp and Paper of our Forest Products Laboratory has contributed immensely to the science and understanding of this art in addition to developing new pulping techniques. They were

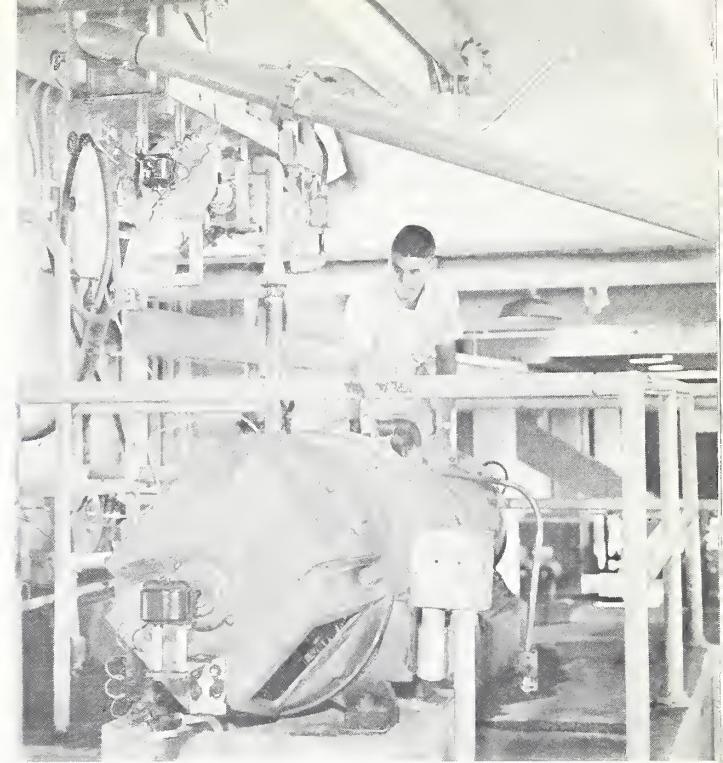
pioneers in installing an experimental paper machine, small but complete, with all necessary accessories. This experimental paper machine has been used to make samples of paper from various wood fibres and in various blends of assorted fibres, thus contributing substantially to the art of papermaking.

I believe it is possible that a second reason for my being selected by Dr. Locke to appear here this noon is that my span of intimacy with the Lab and its personnel may be longer than any other available speaker from our industry. I can recall driving past the original building with my father probably around 1915, when I was 15 years old, and hearing his comments on what a marvelous asset this was for our nation and for our industry. Not long after that Dr. Otto Kress accepted a position with our company after resigning from the Division of Pulp and Paper. I still have letters which Father wrote to me in college in my senior year saying he was preparing a position for me in the company, working in technical projects under Dr. Kress. I regret to say that this plan did not materialize and I am unable to recall the reasons. Some time after that, having been impressed with the Lab's studies in sulphite pulping as recorded and published in the Miller and Swanson papers, and also the Swanson and Monson



then beaten to the proper freeness, and . . .

papers, our company undertook a cooperative project with Lab personnel to apply the fundamentals developed in these studies to our sulphite mill's operation. In our company's sulphite mill these scientifically developed and proven techniques were adopted in 1930 and they remain in effect to this day, a continuing proof of the soundness of the Lab's research and its results more than 30 years ago. Then again in 1930 when our company was contemplating the addition of forestry activities and land ownership we sought help and advice from various leaders. We scheduled a three-day symposium at a recently abandoned lumber camp in Langlade County, east of Antigo near Highway 64. Several well-known experts were there to talk with us and to look over the potential of cut-over forest lands. Cap Winslow, Director of the Lab, Carl Curran, Chief of the Division of Pulp and Paper, Carol Sweet, one of the Lab's department supervisors, and one other whom I can't recall constituted the delegation from this Lab. We also had Dr. Raphael Zon, Director of the Lake States Forest Experiment Station, and E. W. Tinker, Regional Forester from Milwaukee. You can imagine what a gab fest we had at that three-day symposium. It was constructive and inspiring. We in the paper industry knew very little about forestry and for that matter nobody had the conception of it in



touched up in the jordans on the way to the paper machine.

1930 that we have today. Suffice it to say that our company proceeded to develop the plans laid at that time and we are immensely proud of our accomplishments in forestry as revealed in our forest holdings today in Wisconsin.

Another interesting event in our company's 50-year association with the Forest Products Lab was the introduction of resin impregnating and plastic laminating by Lab personnel to our company around 1943. The Mitscherlich sulphite pulp from our Appleton mill had shown unusual strength and quality for this application and we were asked to develop it as a war effort, which we did. That story is long and complicated and I will omit all but the final development, namely our \$2,500,000 plant at Wisconsin Rapids which makes Consoweld Laminated Plastic. Consoweld, as I hope you know, is a decorative surfacing material for counter tops, cabinets, and walls. Consoweld Corporation is successful and is a valuable subsidiary of our company. It developed after the war as a sequel to our original undertaking which was fostered by this Lab.

Now I come to our company's most recent cooperative project with the Lab, namely the adoption of semichemical pulping at our Wisconsin Rapids plant. More technically known

as neutral sulphite semichemical, it has been made known to the trade by the Division of Pulp and Paper of this Lab about 1923. The process was offered at that time as a method for pulping poplar, chestnut, and other hardwoods, making a coarse, dark pulp very practical for use in the papers required for shipping containers. In 1946 the Lab personnel indicated to our company that they believed this same process could be developed further to produce bleached pulp from hardwood trees and for use in white papers. Although the fibres from broadleafed trees or hardwoods are shorter and weaker than those from coniferous woods this special semichemical pulp from hardwoods exhibited unusual strength and might be used as partial displacement of the coniferous pulp. The process could be introduced in a going sulphite mill by installing supplementary facilities to the existing plant. With advice and guidance from Lab personnel our company worked on this for several years and finally succeeded in reaching standard production and use of bleached hardwood semichemical pulp. We produce an average of 70 tons per day. This production consumes 120 cords per day of what we term mixed hardwoods, which are oak, ash, elm, maple, birch, and popple. Prior to our ability to use these species we had had to obtain 95 percent of our pulpwood from remote areas via rail shipments. Now we are buying about 25,000 cords annually from local producers within a 50-mile radius and this wood is delivered by truck. It gives farmers and other rural residents gainful employment in winter which is normally the quiet season for farmers. Last winter we bought 20,000 cords by truck delivery and paid the producers \$620,000 for their pulpwood. Thus our adoption of this new pulping technique has benefited society as a whole as well as our company.

In summary, I think these citations of the contributions to the paper industry in knowledge, understanding, and progress in new areas are convincing evidence of the Lab's great value to our society. While the ones I have cited are only those of personal experience I know and many others know that the Lab's pioneering in other fields has been equally significant and productive. Their goal of greater utilization of the forests and greater understanding of forest values is definitely productive, and definitely rewarding to our nation as a whole. I feel privileged as one

spokesman for our pulp and paper industry to express appreciation publicly to the Forest Products Laboratory on their Golden Anniversary and to wish them continued progress in this vital endeavor.

Our next speaker this noon is the Honorable Gaylord Nelson, Governor of Wisconsin, and it is my privilege to make some introductory remarks. Gaylord Nelson was born in Northern Wisconsin and spent his boyhood there. This was in the little Polk County Community of Clear Lake, some 50 or more miles northwest of Eau Claire. Inasmuch as 1917 was the year of his birth, this period of boyhood was in the years of adjustment experienced by northern forest communities when the loggers had departed, under the old cut out and get out practice of logging virgin forests, and so Gaylord had an opportunity to understand the problems and know the hardships which northern communities faced up to in that bleak, charred, and brushy countryside. In his boyhood adventures in wilderness areas he gained intimate familiarity with the character and potential of Wisconsin's North Country, the land of lakes, streams, and boundless distances with ideal habitat for game and aquatic life of endless variety. His love of the forest and Nature's finest expression in forest areas is deep and abiding.

Gaylord performed his military service with the U.S. Navy, and after the war came back to his native Wisconsin to get a law degree in our University of Wisconsin Law School. He opened a law office in Madison, Wisconsin, and fortunes of politics brought him to the State Senate, where he served for ten years. He was a member of the Joint Committee on Finance and served a term as minority floor leader. Finally, in the fall of 1958, the voters of Wisconsin brought him to the east wing of the Capitol and the Governor's Office.

Throughout his career in government Gaylord has shown a strong interest in the advancement of Wisconsin's great heritage in Conservation. So it is fitting on the occasion of the fiftieth anniversary of the Forest Products Laboratory that we should hear from a man who understands and wholeheartedly subscribes to the purposes and the principles that we are honoring today. I am pleased to present to you the Governor of Wisconsin, Gaylord Nelson.



Wisconsin's Forests--

FOR RECREATION, CONSERVATION, AND INDUSTRY

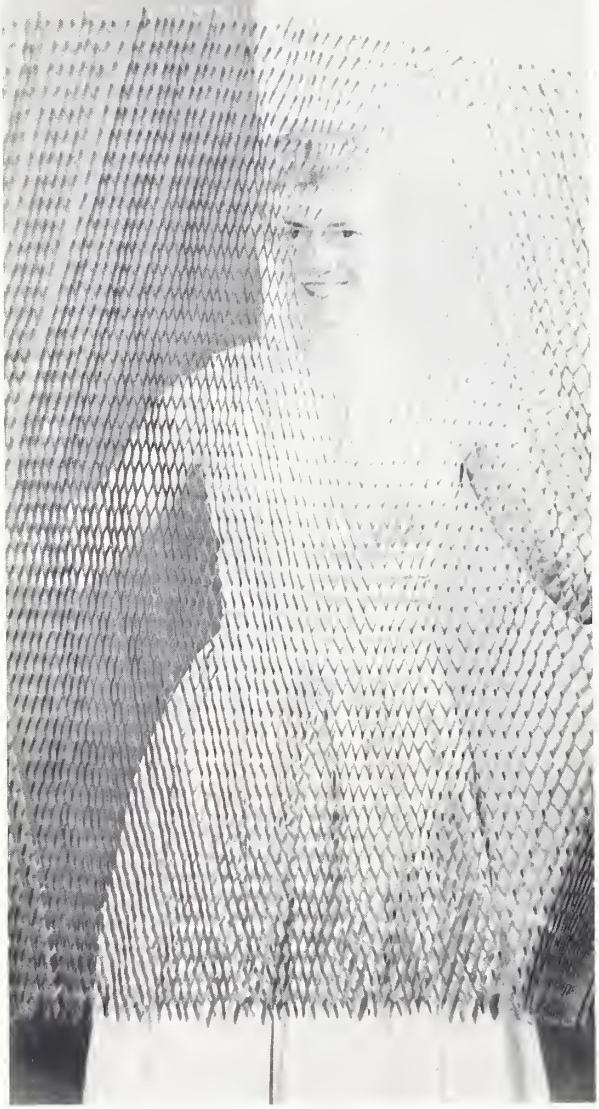
HONORABLE GOVERNOR GAYLORD NELSON
State of Wisconsin

The distinguishing characteristic of the Twentieth Century will be found not in the destructive wars that have appalled humanity, not in the changes in political idealism, but in the amazing broadening of human knowledge.

This great institution, the fiftieth anniversary of which we are celebrating today, is but one of the many man has set up throughout the world to speed his inquiry into the areas of the unknown. The Forest Products Laboratory is, however, one of the great ones--great in the eminence of the scientists who constitute its staff, and great in its accomplishments. We, representing the State of Wisconsin, are proud and happy that it is located within our borders, and grateful to the men whose wisdom, foresight, and energy were responsible for its establishment and the de-

termination of its site. They were indeed pioneers, for this was the first wood-research laboratory in the world. It is impossible for us to accord them full honor and gratitude. We can best give our thanks by re-dedicating ourselves to the intelligent pursuit of their objectives.

At the turn of the century, there was slight knowledge of forestry as a science in this country. It might be said that the only interest in forests in America was to get them converted into lumber, producing both profit for the mills and cleared land for the cultivation of agricultural crops. The very abundance of forest growth in America created a tradition of destruction and waste. The words of Increase A. Lapham, spoken in 1855, aptly illustrate the disregard in which forests were held in that early day. Lapham was the father



of conservation in Wisconsin. He said: "It is much to be regretted that the very superabundance of trees in our state should destroy, in some degree, our veneration of them. . . . The question is not how they shall be preserved, but how they shall be destroyed." Only the advanced thinker had foreseen the results of our lack of a forest policy. Those who advocated treating the forests as a valuable resource that was in danger of exhaustion were dubbed "conservationists," and the word was loaded with a surcharge of scorn. Gifford Pinchot, of Pennsylvania, was the outspoken leader. President Theodore Roosevelt became his ardent convert, and fortunately it was a powerful alliance. Together they revamped the Department of the Interior and created the Forest Service in the

NEW PRODUCTS, such as this paper honeycomb core material for sandwich construction, are expanding wood's usefulness and versatility.

Department of Agriculture. Wisconsin, with its usual alertness, and with apprehension of danger to its own economy through forest destruction, was quick to appreciate merit in the new doctrine of conservation. In 1904 it created a State Board of Forestry with an European trained forester, Dr. E. M. Griffith, at its head. The first efforts of the department were directed at the establishment of means to curb the loss of timber by fire. Careless methods of logging the enormous pine forests of the state had made our area peculiarly susceptible to disastrous fires, like the great conflagration of 1871 which burned over a million and a quarter acres of forest land and destroyed the village of Peshtigo.

The next step was to organize a tree planting program. This was effected in 1911. The way of conservation in Wisconsin, however, was not an easy one. There was no public concept of land use for other than conventional agriculture. There was no comprehension that forests could be developed that were capable of returning profits other than those that had already been realized by the lumberman, and the idea of devoting land to the slow process of growing trees was considered unrealistic. It was only through the dogged persistence of a few men that the public was conditioned to the acceptance of forestry as a sound departure. With the establishment of the Forest Products Laboratory came the realization that science could develop new and better ways in wood-utilization so that waste could be minimized and the material that composes the tree could be used to the fullest. From these beginnings has grown this magnificent research laboratory, known throughout the world.

Wisconsin is bound to be a timber producing region. Originally, 30 million of the 35 million acres of land within our borders was heavily forested. Almost one-half of the 35 million acres is presently classified as having its highest productive use as commercial forest land. Of this 17 million acres of forest-crop land, 2 million acres are owned by the federal government, and about 3 million acres by the state and local governments. The re-

maining 12 million acres are owned privately, mostly in holdings of 5 thousand acres or less.

It is perhaps unfortunate that the word "conservation" should come to describe those activities that relate to the improvement of natural resources. The term implies merely a custodial job. The objective is not to keep a forest, for instance, from being cut, since trees, like every other living thing, grow old and deteriorate. Conservation, in its true sense, is the management of natural resources so that they are not destroyed or abused, but continue to benefit the public now and in the future. This means not only economic welfare, but the enjoyment of the recreational and aesthetic values inherent in our water and forests. These endowments, commercial, recreational, and aesthetic, may be greatly enhanced by judicious management. Thus, when we speak of "conservation," we mean the orderly use and development of that which nature has given us. This is particularly true of the forests, for they serve a multiple purpose and their conservation is basic to all the other resources of a woodland system--water, soil, timber, recreation, and fish and game habitat.

It is difficult to maintain a wise balance in forest conservation programs. To the sportsman, the woods are a place to hunt. To the industrialist, they are a source of raw material, to the vacationer, a haven for rest and recreation. Each considers his viewpoint as the one entitled to dominance. The problem of forest management is to hold these several, sometimes conflicting, interests in balance while providing that each be served.

The State of Wisconsin may lack natural resources such as oil and coal. But these are exhaustible resources, while forests, if properly managed, are a renewable resource. This is why our forest conservation program is built on the basic principle of sustained yield. It is in aid of that objective that this great laboratory is provided and maintained by the federal government.

Man's use of wood is as old as the human race itself. The fact that wood grew, and

SMALL SAWMILLS will continue to constitute an important segment of the forest products industry. Better sawing accuracy will improve the product, increase profits, minimize residues.

that it was useful as an implement, was all that man cared to know about it throughout the ages. But the curiosity of the twentieth century and the discoveries relative to the structure of matter have stimulated an intimate inquiry into the properties and applications of wood. These researches have been of enormous economic consequence to Wisconsin and will be of still greater consequence as wood yields its secrets to the exploring scientist. Already they have wrought a revolution in the art of papermaking.

Wisconsin is the leading state in the Union in the manufacture of pulp and paper, both in quantity produced and in the value of the product sold. The production of Wisconsin mills in 1959 exceeded 3 million tons. That is more paper than was produced in all of the United States in 1900. To produce this amount of paper requires nearly 2 million cords of pulpwood. The paper mills of the state furnish employment to more than 40,000 of our citizens, and the industry pays to the state and local





WISCONSIN PULP MILLS now derive nearly half their pulpwood requirements from within the State (only 17 percent ten years ago), thanks to FPL research on processes for pulping hardwoods.

taxing units over 26 million dollars annually. Including the federal tax, the Wisconsin paper mills pay a total of more than 104 million dollars per year in support of government. Indeed, the economy of the entire northern portion of Wisconsin depends on the paper industry. The contribution of the Forest Products Laboratory to the technical progress of this great industry has been, and will continue to be, one of the spectacular achievements of modern scientific research.

EXPANDING POPULATION will require more paper and other wood products. Growth—quality relationships need more study for most effective long-range tree planting.

The paper industry is not the only economic activity that owes a debt of gratitude to the Forest Products Laboratory. Lumber, plywood, and veneer are Wisconsin products, and we have a variety of wood consuming enterprises, from sash and door production to boat-building and charcoal manufacture. These, too, are important in the Wisconsin economy. The saw-log and saw-timber requirements of the state are presently on the order of three-quarters of a million cords annually, or, in lumbermen's language, 250 million board feet.

Until about ten years ago, due to the depletion of our forests, the paper mills of the state depended in large measure on wood from other states and from Canada. Wisconsin was able to furnish a mere 17 percent of the wood our mills then required, though much less paper was being produced at that time. Through discoveries of the Forest Products Laboratory of methods of pulping inferior woods, through wise conservation policies, and through the efforts of the mills themselves to extend cellulose extraction, our forests are now able to supply almost one-half of the total pulp-wood requirements of Wisconsin mills. This is a signal achievement; but it can be surpassed. The pulp-wood taken from our forests today is only 60 percent of the annual growth and 89 percent of the permissible cut. In the not distant future, our state forests may produce upwards of 75 percent of the pulp-wood used by Wisconsin mills. There is comfort in this assertion; but we dare not relax our efforts to preserve and develop our forest resources.

By 1965, the population of the United States will have risen 13 percent over 1959, and real income will have increased 25 percent. If the requirements for paper are consistent with the national growth, our Wisconsin mills will be using 3 million cords of pulp-wood annually by 1965. By that year, we expect the forests of the state to furnish two-thirds of the pulp-wood requirements of our paper industry, and the other wood-consuming industries will be proportionately served. This is a large order. To fill it our forestry activities must be accelerated.

Wisconsin has six state-owned nurseries for the rearing of planting stock. In 1957-59 these six nurseries produced and distributed over 69





ELECTRON MICROSCOPE at the FPL enables researchers to probe more deeply into the way lignin and cellulose are combined in the cell walls of wood.

million young trees for state, county, school, municipal, private, and industrial forestland. In 1959-61, the conservation budget calls for distribution of 90 million trees. In addition, there are four industrial nurseries in the state which produce and distribute over 4 million trees a year. Tree planting in the state has been increasing by as much as 146 percent a year, compared to a national increase of 12 percent. Since 1911, the state nurseries have distributed 589 million trees for planting in Wisconsin; 820 thousand acres of land have been reforested. This is a fine record, but it must be improved upon. There is still little known about the acceleration of tree growth by fertilization or the introduction of trace-elements into the soil. The study of genetics as they affect the quality of wood grown and the growth of trees is just begun. Our record leaves Wisconsin in seventh place among the

states with tree-planting programs, exceeded by Georgia, Michigan, Florida, Mississippi, Louisiana, and New York. If we are going to keep up with the increasing demand for wood we must do better, especially since new uses for wood are constantly developing as its chemical possibilities are realized. Wood no longer can be thought of in terms of its traditional employment purely as a mechanical material. It is also a source of chemical products just as oil and gas are the source of many useful commodities other than fuels. Already, these chemical by-products range from plastics to synthetic flavoring extracts.

Meanwhile, the conventional requirements for wood increase at a rapid rate. In the United States, we are now consuming paper at the rate of 435 pounds per capita per year. Fifty years ago, the rate was 93 pounds. Today, there are more than a thousand uses to which paper is put.

Thanks to the work of research scientists and of institutions such as this great Forest Products Laboratory, wood is becoming ever more valuable, and in ways far removed from the primitive uses in which it has served man throughout the ages. According to Dr. George Harrison of the Massachusetts Institute of Technology: "All the cellulose our forests can produce will soon be needed for lumber and paper, for rayon and other fibers that can be made from cellulose molecules. By A.D. 2000, less than 40 years away, our forests should be routinely tidied up to serve as factories that use the energy of sunlight to make complex molecules out of simple carbon-dioxide and water from the air."

Recognizing the vital importance of our forest resources, the federal government has set up a long-range program covering each of the main contributions of the National Forest--timber, water, recreation, and wildlife habitat. This program anticipates an increase in the annual harvest of wood from 8 billion board feet cut in 1958 to 21 billion expected to be cut 40 years from now. It is founded in the belief that our timber, our soil, the minerals under the land, the streams that cross the land, the wildlife habitat and the recreational resources all must be safeguarded, improved, and made available--not only for this generation but for posterity. To this belief we in Wisconsin are likewise dedicated.



JOHN SHOPE, chief engineer for the National Lumber Manufacturer's Association, presented Dr. Locke with a plaque recognizing the Forest Products Laboratory's "outstanding accomplishments in the field of wood research, development, and technological services."



DR. LOCKE reads the text of a plaque presented by J. M. Gurd, president of American Wood-Preservers' Association:

WHEREAS the United States Forest Products Laboratory is celebrating the Golden Anniversary of its founding; and

WHEREAS its facilities and personnel have contributed such outstanding, unstinted assistance; and

WHEREAS the Golden Anniversary program is to be held June 2, 3, and 4, at the Forest Products Laboratory, Madison, Wis.; be it therefore

RESOLVED that the American Wood-Preservers' Association in meeting assembled gratefully acknowledge its indebtedness, and extend its best wishes for continued success and that copies of this Resolution appear as a part of the minutes of this meeting and that a copy thereof be tendered Dr. E. G. Locke, Director.



PRESENTATION OF THE

Prefabricated Housing Plaque

GEORGE E. PRICE
Home Manufacturers Association



G. E. PRICE, National Homes, Inc., called results of FPL prefabrication research "the greatest single contribution to housing since the invention of the nail." Director Locke (right) and R. F. Luxford (left), who pioneered early prefab work, look on.

A common complain heard these days is that world events are moving so swiftly it is difficult for us to keep pace with them. I don't deny this, for it is obviously true. But I have always been one to look on the positive side of things. I can see an advantage in most any situation, and I certainly can see a favorable aspect connected with this one.

The fortunate thing about the modern pace of things is that we now have an opportunity to pay tribute to people who have developed something that adds to the enjoyment of our life. It isn't as it used to be in the old days when a person might invent or develop something of benefit to mankind but would be dead and gone before he was recognized for his contribution.

Fortunately, we can stand here today and look back over the few short years that have passed since the Forest Products Laboratory of the United States Department of Agriculture Forest Service made the greatest single contribution to housing since the invention of the nail. I am talking about that time, about 1933,

when this forward-looking department of the government began its research on engineered housing for factory production. It adapted to this program the stressed-skin design originally used in World War I for aircraft wings and fuselages. That design, based on research beginning as early as 1910, provided the key to the modern-day house.

From the very beginning of their involvement in the problem of developing a modern house, this stressed-skin principle appeared to be a "natural" to the engineers of the Forest Products Laboratory. It was adapted for the 4-by 8-foot panel, a size which was dictated more or less by the fact that this is the most common size of plywood, a basic material used in the stressed-skin panel. This fact gave rise to the so-called 4-foot module which engineers and architects are still using in the further development of modular-constructed homes.

The first house employing this stressed-skin principle was built in 1934 after the Forest

Products Laboratory, which with its usual devotion to scientific detail, had made many tests of individual panels to establish basic strength values for engineering design purposes. These tests proved that the stressed-skin principle offered the most advantageous ratio of weight to strength. Speaking from National Homes' experience of having built nearly 200,000 homes, this was the key that opened the future to home manufacturing, for a basic consideration was the necessity of transporting the panels to the building site once they had been produced in the factory. Obviously, this could not be done if the weight factor was such that they could not be transported by any means that would be economical and practical.

The fact that this first house was later dismantled, since it was purely experimental and made of interior-grade plywood skins, did not lessen the far-reaching importance of this experiment. As a matter of fact, it made easy the transition to the next phase of this major development in home building. The Forest Products Laboratory quickly developed the first exterior-type plywood, made of waterproof synthetic-resin adhesive, which was a forerunner to today's stressed-skin panel. The Douglas-fir industry quickly picked up the Laboratory's development of this new type exterior plywood, and within a short time, two houses of permanent construction were built. They are still in service for office use, and I am proud to say that this plaque presentation is now being made where they stand.

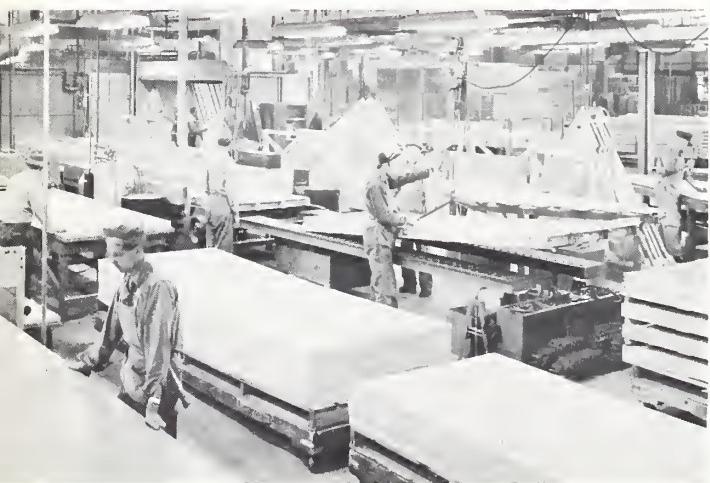
The home manufacturers are deeply indebted to the Forest Products Laboratory for its

farsightedness in developing the basic structure which has given life to this revolutionary-new way of building. All the advances that we have been able to make since the inception of this relatively new part of the home building industry have been but extensions of the original idea created by the Laboratory. By applying the methods of modern manufacturing, we have been able to speed up the processes, gain greater efficiency, and produce at lower costs. But we have not moved very far away from the basic concept of the stressed-skin panel. It has enabled home manufacturers to bring to American families homes of exceptional quality at prices they could afford. It has been easily adapted to the work of the country's finest architects, and today, home buyers, whether they are in the market for a home costing \$10,000 or \$100,000, can buy models in Cape Cod, Colonial, and Contemporary styling and in a variety of floor plans, providing the utmost in modern living.

The stressed-skin panel has also proved to be adaptable to every modern advance in home building. I can think of no better example than the introduction by National Homes of its Viking aluminum line a year ago last January. This was a development that revolutionized home building, yet it involved basically the application of aluminum to our standard panel. This development has proven to be so popular that three out of four of our buyers today are asking for Viking aluminum exteriors. But by buying one of our manufactured homes, whether it has an aluminum exterior, brick, weatherboarding, or any other kind of siding material, they are expressing confidence in the basic structure, which is the basic structure developed by the Forest Products Laboratory nearly 30 years ago. This is a remarkable achievement in these times when so many inventions and technological developments play such a fleeting part in the progress of our American people.

On behalf of the Home Manufacturers Association, I am proud to present this plaque expressing our appreciation of the great contribution of the Forest Products Laboratory in the development of home manufacturing in the United States.

ONE IN TEN of the homes built today is factory-manufactured, and most of these manufactured homes are based on the Forest Products Laboratory stressed-skin principle.





Factory-Built Houses*

R. F. LUXFORD, Engineer, Retired
Forest Products Laboratory

Following the years of the 1929 depression there was a great need for cheaper housing. Engineers at the Forest Products Laboratory conceived the idea that the principles of glued construction for airplanes developed during World War I might be applied to housing. If so, the cost of housing might be reduced and a large part of housing construction placed in factories.

It was learned in airplane construction that by gluing plywood to light wood framing members very much higher strength could be obtained over that obtained by simply nailing the same materials together. Briefly, this is the method used in most factory-produced houses. In other words, plywood or other sheet material is glued to light small-sized framing members to give a strength greater than conventional 2- by 4-wood studs, together with nailed wood sheathing, siding, etc.

This was an innovation in house construction, and a patent covering this glued construction principle was granted in 1939 to Newlin and Trayer, former members of the Forest Products Laboratory.

The house we are now facing employed this new glued construction principle. It was designed by Holabird and Root of Chicago, noted architects, who also designed our main building.

*Speech accepting Prefabricated Housing Plaque.

THE FIRST prefabricated houses, erected on FPL grounds in 1937. Both are currently used for offices.

The house was submitted for bids, and Goodwillie-Green of Rockford, Ill., were the successful bidders. It was their first prefabricated house, but it set them up in the prefabricated business. The bid price was, as I remember, \$5,000. Wouldn't it be wonderful if we could build an equally good house today for the same money?

This house was built and erected in the fall of 1937. I can well recall the rush we were in to complete and furnish it by a certain date in November so that it would be ready for Mrs. Eleanor Roosevelt's visit during her brief stay in Madison. We made the deadline, but what a hectic day and night before her arrival! Mrs. Roosevelt was at the time particularly interested in low-cost housing, and so it had a special appeal to her.

Our accomplishment in a new method of house construction received a great deal of publicity in newspapers and trade journals. Many manufacturers became interested in the new idea, and the prefabricated housing industry was born.

Today, factory-manufactured houses are an important part of the house construction industry. It is estimated that factory-built houses account for about 8 to 10 percent of the total number of houses being built today. With the total number of houses per year being over 1,000,000, you can see that factory-built houses now form a very important part of our house construction industry.

PRESENTATION OF THE

Insulating Board Scroll

ROBERT A. LaCOSSE, Technical Director
Insulation Board Institute



DIRECTOR LOCKE and W. C. Lewis (left) FPL composition board specialist, admire the Insulating Board Scroll presented by R. A. LaCosse.

Dr. Locke, Mr. Lewis, it gives me great pleasure indeed to join hands with nine other wood products industry groups in congratulating your world-famous laboratory on the occasion of its Golden Anniversary.

In behalf of the fifteen member companies of the Insulation Board Institute, which combined account for the production of over 95 percent of all insulation board products produced in the United States, it is my privilege to present to you this scroll, which reads as follows:

"Whereas, the Forest Products Laboratory is celebrating its Fiftieth Anniversary, and

"Whereas, during its long and dedicated service it has made innumerable contributions to the entire construction industry as well as the forest product industries, particularly in the field of scientific research with outstanding accomplishments in improving existing products and developing new products for all segments of the forest industries, and

"Whereas, the Insulation Board Industry has

benefitted in substantial measure from these accomplishments,

"Now, Therefore, be it Resolved, that the officers and members of the Insulation Board Institute tender to the Forest Products Laboratory, their warm thanks and grateful appreciation for its many contributions to the Insulation Board Industry and their best wishes for its continued success in the years ahead, and, furthermore, that this Resolution be spread upon the records of the Institute and a copy thereof be suitably engraved and presented to the Forest Products Laboratory."

The names of our fifteen member companies are inscribed at the bottom of this scroll, which is signed by myself and Mr. Charles M. Gray, Manager of the Insulation Board Institute.

It has given me great personal satisfaction to present this scroll to the Forest Products Laboratory in formal recognition of the benefits our industry has derived and will continue to derive from your continuing research. Thank you.

A Short History of Insulation Board *

WAYNE C. LEWIS, Engineer
Forest Products Laboratory

The history and growth of the insulating board industry closely parallels that of the Forest Products Laboratory. Started in 1914 as a means of utilizing a residue from pulp and paper manufacture, it has shown continued growth during the past 46 years. About 5,000 tons of board are produced each day in the United States mainly from wood.

* Speech accepting Insulating Board Scroll.

Insulation board was first produced for uses where its prime purpose was thermal insulation, but early in World War I it was first used experimentally as other components in emergency military housing. This use opened a whole new concept as structural insulation board. Thus, as World War I established the importance of the Forest Products Laboratory as an organization for research in forest products, so did it also set the pattern for utilization of insulating board.

The Laboratory is proud to have been able to cooperate through the years with the insulating board industry. Research here on methods for evaluating the structural properties, fire resistance, vapor movement, and decay resistance of these boards has proven beneficial to both.

Two recent examples of this cooperation, illustrated by exhibits at this Open House, are worthy of mention. The development of the 8-foot tunnel for measuring flame spread resistance was a joint research effort of the Laboratory and industry in which the Insulation Board Institute played the major part of coordination. The example of insulating roof deck behind you illustrates a structural use that was established through coordinated research between the Laboratory and the insulation board industry.



INSULATING BOARD roof decking being applied here combines structural strength with insulating qualities.

PRESENTATION OF THE

Semicchemical Pulping Plaque

W. H. SWANSON
American Paper and Pulp Association



G. H. CHIDESTER (left), chief of the Division of Pulp and Paper, Director Locke, and J. A. Staidl (right) hear W. H. Swanson of Kimberly-Clark praise the Laboratory's research accomplishments in semichemical pulping.

Dr. Locke, may I indicate to you, first, that Mr. Kimberly regrets deeply his inability to be here to represent the American Paper and Pulp Association on this occasion. I assure you that he has great personal respect for the Forest Products Laboratory and the contributions it has made to the Forest Products Industries over the last half century.

As for myself, I am most appreciative of the opportunity to substitute for Mr. Kimberly at this time. This gratification, on my part, stems from the fact that I was at one time a member of this organization, and the training and experience that I attained here during that period have proven most valuable to me ever since.

The American Paper and Pulp Association holds the Forest Products Laboratory in very high esteem for the many contributions it has made to the Pulp and Paper Industry. These have been of real and significant value. As tangible recognition of these contributions,

the Association is presenting to the Forest Products Laboratory at this time a commemorative plaque.

As you will note, two of the many contributions which the Laboratory has made are highlighted on this plaque. Specifically, they are the Semicchemical Pulping Process and the Cold Soda Pulping Process. Both of these processes have broadened the spectrum of wood species suitable for paper products. And the end products that incorporate these types of pulps have been measurably improved both as to their quality and their economic usage.

These contributions are also illustrative of the type of research, research guidance, and research administration that are of highest value to our society. May I amplify the meaning of this statement. The concept of the neutral sulphite Semicchemical Pulping Process was one of creative uniqueness. This is an objective which is most desirable for research effort to attain. Then, the persistent

follow-up by the Laboratory Staff of the original concept in the direction of process and product improvement has led to its wide acceptance and application in the Pulp and Paper Industry, not only in this nation but worldwide. And, finally, the evolutionary aspect of research is represented by the Cold Soda Process. The imaginative process modification exemplified by this innovation has a-

gain led to broadening of the opportunity for wood utilization and extensive end-product application.

Dr. Locke, as representative of the American Paper and Pulp Association, I am most happy to present to you, representing the Forest Products Laboratory, this Commemorative Plaque.

The Beginning of Semicchemical Pulping*

J. A. STAIDL, Engineer, Retired
Forest Products Laboratory

In our early experiments to produce semi-chemical pulps, I have to liken our research work to the manner in which pilots flew airplanes during World War I. We both arrived at our destination by the seat of our pants.

In 1920, Bradly and McKeeffe were granted a patent for the manufacture of pulp with the use of neutral sodium sulphite as a pulping agent.

The project did not prove to be an economical success, due to high manufacturing costs and their inability to recover the chemicals for reuse.

About that time, Dr. Francis Rawlings conceived the idea of making a low cost pulp from hardwoods that would be suitable for making certain grades of papers and paperboards.

The thought was to develop a chemical-mechanical pulp, in which only enough chemical was required to sufficiently soften wood chips so that pulp fibers could be separated by a mild mechanical treatment.

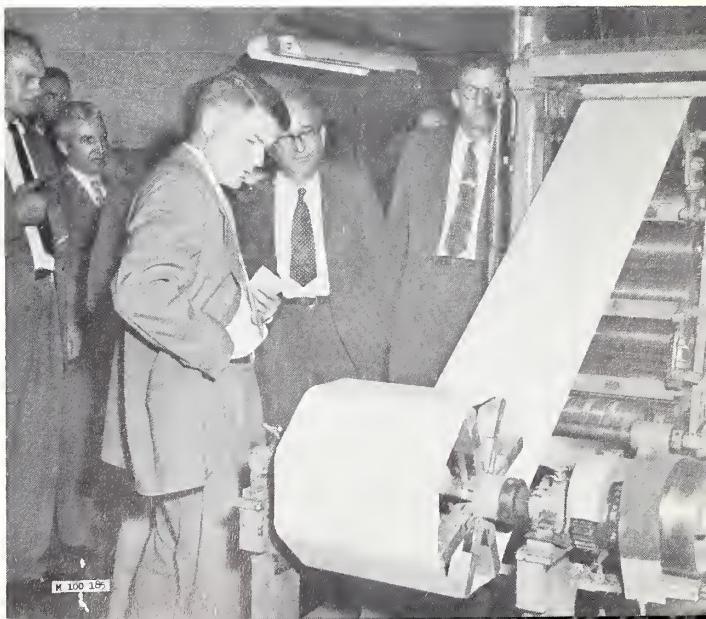
It was reasoned that, if a low chemical usage was effected, a chemical recovery plant would not be necessary.

In the search for a machine for disintegrating the chemically softened chips, Sidney Wells conceived the idea of using a rod mill.

A small rod mill was acquired from the Allis-Chalmers Company which proved to do a good job in separating the wood fibers.

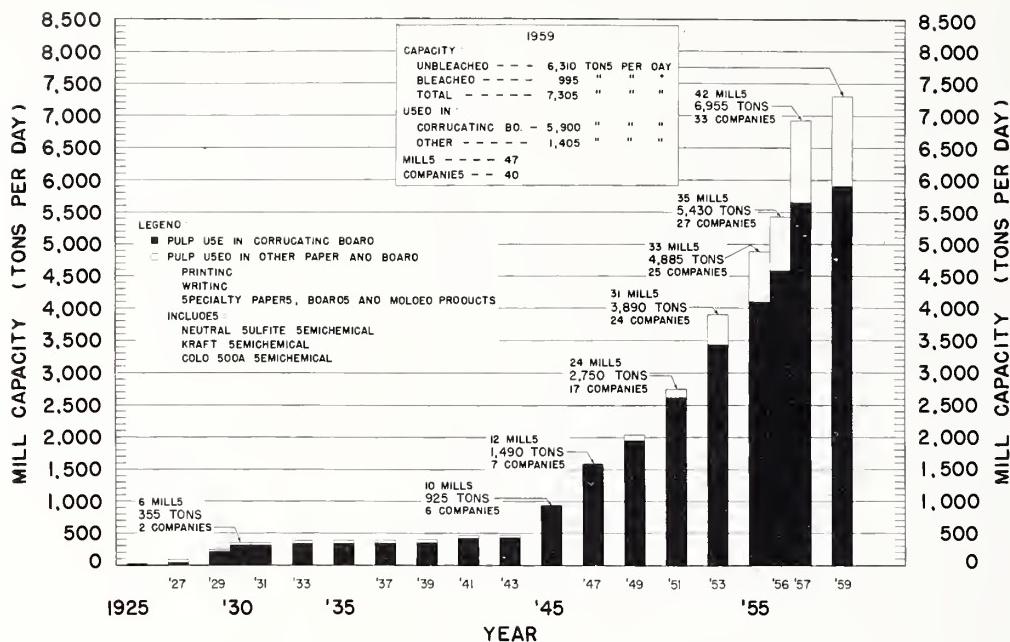
With this equipment we were in business, pulping hardwoods by the neutral sulphite process on a semicommercial scale.

PAPER FROM HARDWOODS comes off the Forest Products Laboratory's small-scale paper machine as industry technical men pay careful attention.



* Speech accepting Semicchemical Pulping plaque.

U. S. SEMICHEMICAL PULP CAPACITY 1925-1959



A patent application for this method of making pulp was made by Dr. Francis Rawlings in 1925.

The experimental work leading up to the development of this neutral semichemical process was the cause of some very interesting opinions and comments.

In those days, considerable reliance was placed on the opinions of our veteran paper maker, Joe Lang, whose judgment of the usability of some of the pulps we made were influenced by his disposition on that day.

Inasmuch as I processed these pulps, I was the recipient of most of Joe's cryptic remarks. He rated scientists rather low on the totem pole, especially those who thought the lowly hardwoods could be used for making quality papers.

In 1924, John E. Oberne, President, Southern Extract Company, Knoxville, Tenn., made a request of the Forest Products Laboratory to investigate an economical use for waste chestnut chips after the tannin had been extracted.

The waste chestnut chips, at that time, were being disposed of as fuel at a value of \$2 per ton.

The first batch of chestnut semichemical pulp we made was the cause of a most classical remark by old Joe Lang.

After examining this chestnut pulp for fiber length, color, and general texture, he made this comment:

"Young man, how in h.... do you expect me to make paper out of pulp that looks like snuff?"

It so happened that the paper machine had completed an experimental run in which wheat straw had been made into 9-point strawboard.

When the chestnut semichemical pulp was run over the paper machine, it became apparent to everyone that chestnut pulp could be used for the manufacture of corrugating board in competition with strawboard.

About 1926 a small neutral-sulphite semichemical board plant was put in operation at the Southern Extract Company Plant to make 9-point corrugating board from waste chestnut chips.

The success of this project, in my opinion, produced the necessary impetus to the beginning of the rapid growth in the use of the lowly hardwood in the paper industry.

PRESENTATION OF THE

Laminated Arches Plaque

FRANK J. HANRAHAN, Executive Vice President
American Institute of Timber Construction



DIRECTOR LOCKE (left) listens as A. D. Freas comments on Laboratory laminating research in accepting the Laminated Arches plaque from F. J. Hanrahan (right).

Distinguished guests, Mr. Chairman, Dr. Locke, ladies and gentlemen. It gives me the deepest sense of pleasure to take part in the celebration of the 50th Anniversary of the United States Forest Products Laboratory. It has been my privilege to be associated with the Laboratory for almost three of the five decades of its existence, first when I was chief engineer for the National Lumber Manufacturers Association, and, in more recent years, through my association with the American Institute of Timber Construction.

The personal associations over the years have been warm ones. Professionally, I have always viewed the work of the laboratory and its staff with the highest respect and admiration.

Throughout its existence, the U.S. Forest Products Laboratory has pioneered and sought better and expanded use of wood and products of wood.

The principle of more efficient use of the entire tree to achieve maximum utility from a natural resource led, in a way, to the forma-

tion of the industry represented by the American Institute of Timber Construction. Those firms engaged in the engineered timber construction field, both glued laminated and sawn, owe a lasting debt to this laboratory because it was in this laboratory that much of the technological basis for our industry was born.

The beautiful modern schools, churches and other structures radiating the warmth of wood were made possible by the work done in this laboratory and by the commercial adaptation of that research.

Our industry, with the contribution we may make to the economy, is just one of many examples of the benefits which have accrued to the public through the work done by the United States Forest Products Laboratory.

At our annual meeting, held in April, our membership authorized the following resolution: Resolution of Commendation to the United States Forest Products Laboratory; "Whereas the United States Forest Products Laboratory pioneered in the research that laid the technological basis for modern en-

gineered timber construction including glued laminated timber and -

"Whereas the generations of men and women who have staffed the United States Forest Products Laboratory faithfully advanced forest conservation and forest products both in the government and in industry for the benefit of the public and -

"Whereas the work of the United States Forest Products Laboratory has helped provide broader, more effective use of a vital natural resource thus strengthening the whole economy and -

"Whereas the United States Forest Products Laboratory is now celebrating the Golden Anniversary of its foundation;

"Be it resolved that the members of the American Institute of Timber Construction salute and compliment the United States Forest Products Laboratory on its indispensable

work and its many contributions.

"Be it further resolved that this resolution of appreciation be commemorated by a suitably inscribed plaque, and this plaque be presented to the United States Forest Products Laboratory on the occasion of its 50th Anniversary, June 4, 1960."

Dr. Locke, I take great personal pleasure in presenting this resolution and the plaque which reads:

For pioneering research that laid the technological basis for the glued laminated timber industry, The American Institute Of Timber Construction presents this plaque to commemorate the Golden Anniversary of the U.S. Forest Products Laboratory June 2-4, 1960

Thank You.

Laminating Research at the Forest Products Laboratory*

ALAN FREAS, Assistant to the Director
Forest Products Laboratory

It is indeed a pleasant task that I have been assigned this afternoon--that of reviewing briefly laminating research at the Forest Products Laboratory.

Early in my career here I was fortunate enough to be assigned to this field under one of the Laboratory's pioneer researchers, the late T.R.C. Wilson. Just getting underway at that time was a study of the strength properties of glued laminated arches and of the factors affecting those properties. Within the next couple of years we had completed studies on the effects of curvature, the effects of lumber grade, the difference resulting from



FIRST U.S. laminated-arch building under construction at the FPL during winter of 1934-5. The building now houses Packaging Research facilities.

applying gluing pressure by clamps and by nails, and so on.

In 1934, Wilson designed the arches for this building and they were fabricated in the plant of a then new company, Unit Structures, Inc., at Peshtigo, Wis. The building was erected

*Speech accepting Laminated Arches plaque

in the winter of 1934-35. After erection, load in the form of sand and gravel was placed above the center arch and the behavior of each of the arches observed for some 5 months.

Included in the arch fabrication contract was provision for two additional half-arches of each of two types. These were tested to destruction in the laboratory, a valuable supplement to the smaller size arches of the main program.

All of this information was combined into a technical bulletin, "The Glued Laminated Wooden Arch," published in 1939. This publication was, for some time, the authoritative source of information on strength and design of glued laminated wood arches.

Wartime shortages of steel gave a great impetus to this type of construction. Increased use also brought new questions and the need for additional refinement in the data to permit more accurate and economical design. In cooperation with the War Production Board, a quite extensive program of research on factors affecting strength was begun. Active in this program, besides T.R.C. Wilson, were R. F. Luxford, now retired from the Laboratory, W. S. Cottingham, a professor at the University of Wisconsin, A.C. Knauss, now of Portland, Oreg., and others.

Tom Wilson and Cottingham had virtually completed a comprehensive report on the wartime project at the time of Tom's retirement in 1947. Completion of the report was left to me. The broad scope of the data then available on strength factors, together with the comprehensive data available at the Laboratory on adhesives and gluing techniques, led to the conclusion that it should be put into a more permanent form. It thus fell to my lot to prepare the section on design of a technical bulletin, "Fabrication and Design of Glued Laminated Wood Structural Members," finally published in 1954.

My participation in this work was concerned only with the factors relating to strength and design. For years, however, the Laboratory has been studying adhesives and techniques for their use. Many people participated in this work over the years, but, most recently, Doc Truax, Don Brouse, Dick Blomquist, and Leonard Selbo are perhaps the most impor-

tant. Selbo was most directly connected with studies of the gluing problems of structural laminating and was author of the fabrication section of the bulletin I mentioned earlier.

I think we can safely say that, without the studies of Wilson and others on strength, the structural laminating industry would not have the stature it has today. Equally, without the work of Brouse, Blomquist, and Selbo, structural laminates would not enjoy the versatility and confidence they now merit.

Beyond the studies mentioned earlier, the Laboratory has worked closely with the military departments in laminating research as related to military applications. Fabrication and design methods for propellers and aircraft were the subject of intensive studies in both World Wars. Ship and boat construction uses laminated wood extensively, and we have long cooperated with the Bureau of Ships. Perhaps most outstanding in this area is our work on both strength and fabrication, which has contributed so heavily to the success of the Navy's nonmagnetic minesweepers. This work is still going on and is currently under the direction of Fred Werren and Leonard Selbo.

I feel fortunate to have been associated with this research program, and it has been a source of great personal satisfaction to have had some small part in the growth of an industry which was a relative infant 25 years ago.

GLUED-LAMINATED wood structural members provide the ultimate in combining grace, warmth, beauty, and utility in modern church and school architecture.



PRESENTATION OF THE

Exterior Plywood Plaque

W. E. DIFFORD, Executive Vice President
Douglas Fir Plywood Association
Tacoma, Washington



T. R. TRUAX reminisced on his 42 years in plywood research at the Laboratory during the acceptance of the Exterior Plywood plaque by Director Locke (left) from W. E. Difford (right).

Dr. Locke, Dr. Truax, it gives me a great deal of pleasure to join with you again in helping celebrate this memorable Golden Anniversary of our Forest Products Laboratory, the laboratory that has contributed so much to all segments of the wood industry.

In behalf of our member firms that produce exterior Douglas Fir plywood, it is my privilege to present to you this plaque, which I understand will be permanently affixed to an exterior wall of this building we are recognizing, the first building with outside walls constructed of exterior-grade plywood. The plaque reads as follows:

"For pioneering research and development of plywood for exterior use, as exemplified in the walls of this building, erected in 1934-35, The Douglas Fir Plywood Association presents this plaque commemorating the Golden Anniversary of the U. S. Forest Products Laboratory, June 2-4, 1960."

As this time, I would like to add a few comments. I think you may remember a wonderful series of advertisements that the Weyerhaeuser Co. ran a few years ago. One of these ads had a special meaning to me be-

cause it pictured Dr. Nevin, whom I identify very closely with plywood. Dr. Nevin tried to use here the principles of plywood gluing that were then established in Germany. In those days, when we were just beginning to talk about exterior glue, Laucks came out with soybean glue. This was the beginning of plywood gluing.

When we began to make plywood in 4 by 8 foot sheets, we had to have a waterproof glue. I think one of the outstanding moments was when this Laboratory began running some tests for us on this glue. The information that resulted is still valid today.

I started three or four years ago suggesting that our plywood industry make only one quality of panel--one that we could sell to everyone. I predict that the work done here in the 1930's and the close relations with the Forest Products Laboratory since has (1) speeded up the day when our entire production of plywood will be made with exterior glues; and (2) we will see a great expansion in the use of wood and glue in the construction of various units. I predict far greater uses in the future because you people here in Madison are on the right track.

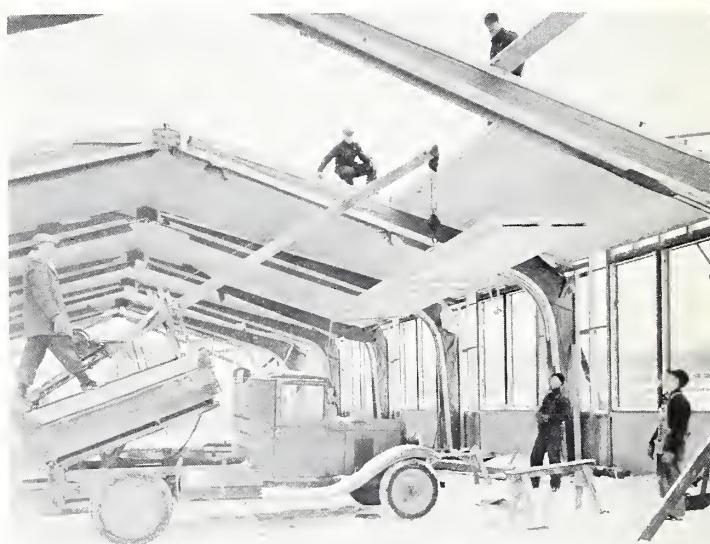
Reminiscences on Plywood Development *

T. R. TRUAX, Former Chief
Division of Timber Processing
Forest Products Laboratory

The presentation of this plaque, commemorating the development of exterior Douglas-fir plywood, brings back memories of my earliest contact with plywood and its producers that began 42 years ago. By coincidence, I reported for work at the Forest Products Laboratory on June 3, 1918, just 42 years ago today.

At the time, the Laboratory's program was almost entirely on World War I problems. Some of the more important problems concerned the production of military aircraft from lumber and plywood. Plywood was considered the best available material for construction of many parts of the plane if it could be made sufficiently resistant to water. Practically all commercially produced plywood had been made with non-water-resistant vegetable and animal glues.

In my first couple of years I became involved in a number of problems such as the drying of cold-pressed, casein-glued plywood; hot pressing techniques for blood-glued plywood; development of dry blood albumen glue film for bonding thin veneers for wing covering, and the laminating of gunstocks and propellers.



ERECTING the first building based on glued-laminated arches and sheathed with exterior-grade plywood. The truck authenticates the 1934 date; the place: FPL south yard.



EXTERIOR PLYWOOD sheathing finds widest application in modern home building, where it combines strength and utility with labor savings in on-the-job application.



FIRST EXTERIOR plywood sheathing, applied to a Forest Products Laboratory building in 1934.

My recollection of those early years at the Laboratory reminds me of a hive of bees on a warm summer day--too many bees for the hive and all hurrying hither and yon at a feverish pace from morning to night. Some were engaged in the formulation and improvement of casein and blood albumen glues and in trying new materials and combinations; others were investigating spreading, pressing, and curing techniques; some were devising test methods and requirements; and still others were designing, making, and testing aircraft components and parts for test, comparing species of wood and veneer-thickness combinations for plywood construction. On glue development and improvement alone there were some 6 or 7 chemists under the able supervision of George M. Hunt.

In the early search for more water-resistant glues, many suggestions came to the Laboratory workers. I remember one in particular that came from a patriotic citizen somewhere out in the southwestern section of the country. He had read of the use of blood albumen for making aircraft plywood and wanted to offer a suggestion. He said that out in his country there were millions of grasshoppers and he thought that grasshopper eggs would be a good glue base material. While the chemists agreed in principle, no one came up with enough grasshopper eggs to make a test.

I think we can fairly say that much of the progress in the plywood industry has been based on the developments that have occurred in glues. Out of the development of casein glues during World War I came visions of an expanded plywood industry. Casein glues soon found their way into the plywood and millwork industries. Laucks discovered in the early '20's that the protein of the soybean could be used in place of the more expensive casein from milk and that formulations for casein glues with some modifications could be used with soybean meal. He also found that soybean glues were well adapted to the bonding of Douglas-fir. The introduction and use of casein and soybean glues into woodworking resulted in a greatly increased production of U.S. plywood during the 1920's.

Then followed the development of the synthetic-resin glues which, coupled with the greatly extended use of hot presses, gave the plywood industry another great impetus and made exterior-type Douglas-fir plywood a reality. The synthetic-resin glues not only benefited the plywood industry but made it possible to laminate timbers for exterior use and to produce satisfactory glued wood products for practically all uses and conditions.

Thereafter, hot presses became common equipment in many plywood plants, glue spreaders were modified and adapted to the new adhesives, and improved equipment for the edge gluing and handling of veneer helped to make plywood manufacture a precision operation. These and other progressive developments have resulted in modern plywood--one of the most useful and versatile of construction materials.

Late in 1919 the Forest Products Laboratory received a small quantity of a material compounded of phenol and formaldehyde that a company in the East wished to have tested as an adhesive. I was assigned the job. I made some plywood with the sample of glue on our

second-hand, one-opening hot press, and ran the usual wet tests. Compared with casein-glued plywood, the results were phenomenal. Shortly thereafter, we learned that the company that produced the sample had been sued by Dr. Baekeland for infringement of his patents and that the company had been absorbed by the Bakelite company, owners of the patents. We also were advised that the Bakelite Company considered the product too expensive to use as an adhesive for wood.

A number of years elapsed between the testing of that small quantity of a phenol-formaldehyde glue and the commercial production of fully waterproof plywood. During this period the synthetic-resin glues were improved and their cost substantially reduced. Tego glue film, developed in Germany from a phenol-formaldehyde base, became available in the early '30's and its production in this country was begun in the mid-'30's by the Resinous Products and Chemical Company. The Haskelite Manufacturing Company, a pioneer in the development of more water-resistant plywood by hot-press methods, was producing phenolic-bonded hardwood plywood in the early '30's. Late in 1934 the Harbor Plywood Company under the leadership of E. W. Daniels announced the availability of Super Harbord--an exterior Douglas-fir plywood bonded with a synthetic-resin glue, developed by Dr. Nevin.

When the specifications for the plywood that covers the exterior of this building were prepared, there was no commercial standard for exterior plywood. One of our requirements was that shear specimens, tested wet, must show not less than 50 percent wood failure. That caused many manufacturers to decline to submit bids. Since that time the requirements have been increased and I understand that today manufacturers of exterior-type Douglas-fir plywood meet a 93 percent wood failure test by the Douglas Fir Plywood Association.

I recall with much satisfaction the many contacts I had with the plywood industry during those 40-odd years; a period that has seen ply-

wood advance from a product, suitable only for limited protected uses, to a product that gives superb service under a wide range of use conditions. I have had an opportunity to know something of the large amount of testing and research that the plywood associations and individual companies have carried out to improve their product and to develop and maintain high standards of quality and performance. I salute the Douglas Fir Plywood Association for their insistence on high standards and the thoroughness and consistency with which they have maintained a high-quality product.

In this age of phenomenal, scientific achievements, the average person has little knowledge and appreciation of the research and development that go into the creation of a new product; nor is the consumer aware of the effort that is required to maintain uniform, high-quality products. I am sure that exterior plywood is no exception to this general observation.



PEELING huge Douglas-fir bolts in a commercial veneer-cutting operation, the first step in the conversion of logs to plywood.



The current Forest Products Laboratory building; 1932 -

WHAT THE VISITORS SAW...

The Golden Anniversary

Some 5,000 persons toured the Forest Products Laboratory in the culmination of the Laboratory's birthday celebration. On this and the following pages are depicted the exhibits and demonstrations they saw as they followed a detailed course through the research areas of the Laboratory's seven technical divisions.

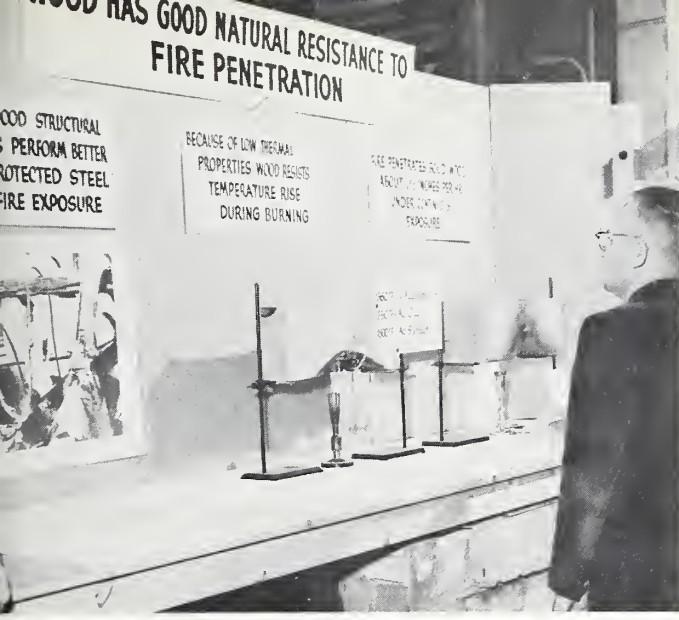
NEW TYPES of wood flooring utilize various types of wood residues, can be bonded directly to concrete.



Timber Processing

Research on glues and glued products, such as plywood, laminated wood, particle board, assemblies of wood, and composite products, is carried on in the Division of Timber Processing. Investigations on wood finishes and on the fire properties of wood, as well as means of modifying those properties, are also conducted. The chemistry of glues, fire retardants, and finishes involves both basic and applied research, while the production and evaluation of veneer, glued products, and fire-retardant-treated products call for technical investigations on wood properties, treating characteristics, durability studies, and fabrication techniques.

Research on adhesives establishes the properties and best uses of the various types of glues, and yields reliable, rapid methods of evaluating quality and serviceability of glue joints. The characteristics of different woods that affect gluing are studied, including effects of treatment with preservatives and other treating chemicals.



INTENSE gas flame had failed to destroy these untreated wood beam sections after 7 continuous hours, emphasizing the important time factor in fire safety.



VISITORS SAW how beauty and strength of laminated wood can be applied in modern architecture, from churches and schools to homes and ships.

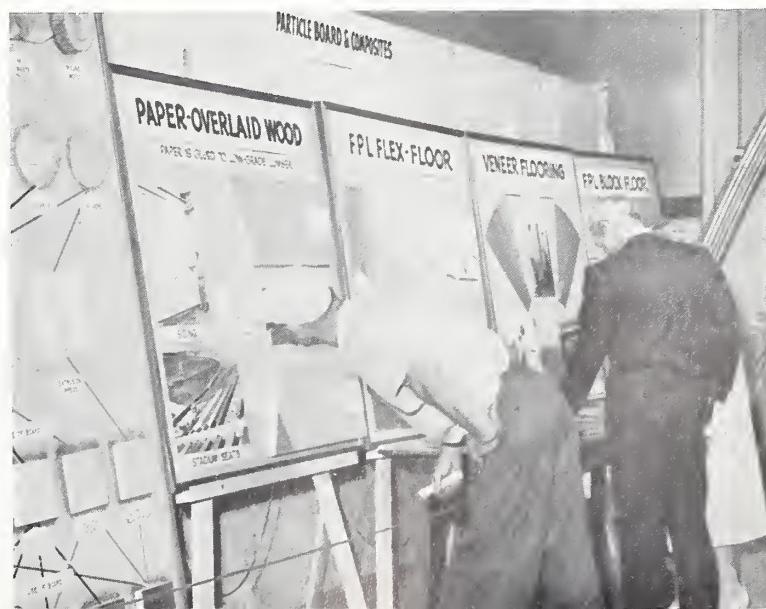
Open House Tour

Veneer production is studied to establish techniques for producing high-quality veneer, especially from species not now widely used. Particle board research is done on such factors as particle sizes and shapes, binders, and production processes for utilizing wood residues. Particle board is widely used in place of solid lumber under the veneered surface of flat furniture parts.

Research on wood finishes is directed toward establishing the finishing properties of wood and wood products, evaluating various types of finishes for outdoor use, establishing fundamentals of paint behavior and deterioration of wood

under service conditions, and developing new formulas for more durable exterior finishes for wood.

Means of giving wood greater fire resistance are pursued through basic research on both coatings and impregnants. The ignition, flame-spread, and fire-resistance characteristics of wood and wood-base materials are investigated.



GLUE AND WOOD, in combination, have opened up unlimited horizons. New products with a future include low-grade lumber overlaid with treated paper, particle and flake boards.



PRESERVATIVES are usually applied by pressure methods when decay hazard is high. Research results from the Forest

Wood Preservation

The protection of wood in use from decay and staining fungi is the principal function of the Division of Wood Preservation. This involves, broadly, research on fungi and their detection and control, and preservatives and treating processes that protect wood from their inroads. In cooperation with the University and other Forest Service groups, the division also conducts some studies on insects and marine organisms that attack wood.

Pathological studies are conducted to establish the natural decay resistance of wood as affected by species and varietal differences, and age and location of wood in the tree, and to establish similarly the fungus resistance of wood-fiber products, such as fiberboards, particle board, and paper, as well as modified woods. In this division, the factors affecting fungi in relation to preservatives and other methods of treating wood to protect it from decay are also evaluated.

Fundamental and applied chemical problems connected with the preservative treatment of wood are investigated through research on the chemistry of wood preservatives. The composition and properties of preservatives are examined, and new toxic chemicals as well as nontoxic treatments are sought. Current work also involves the modification of wood through such means as cyanoethylation and thiamine destruction, which are believed to render wood incapable of supporting fungus

Products Laboratory aid in selecting the best method of preservative treatment for a given job.

growth. By this approach, the decay fungi are starved rather than poisoned.

Related research on preservatives includes development of toxic precipitates that can be deposited in wood by simple methods, such as the double diffusion treatment of green wood.

Control of decay in wood construction is sought through research on methods of protecting lumber, pulpwood, and other primary products through analyses of decay hazards and development of methods of preventing decay in posts and poles, buildings, containers, boats, and other structures.

DOUBLE DIFFUSION, a unique process of combining toxic compounds chemically within wood, can be used on a small scale with a minimum of experience and equipment.



Physics and Engineering

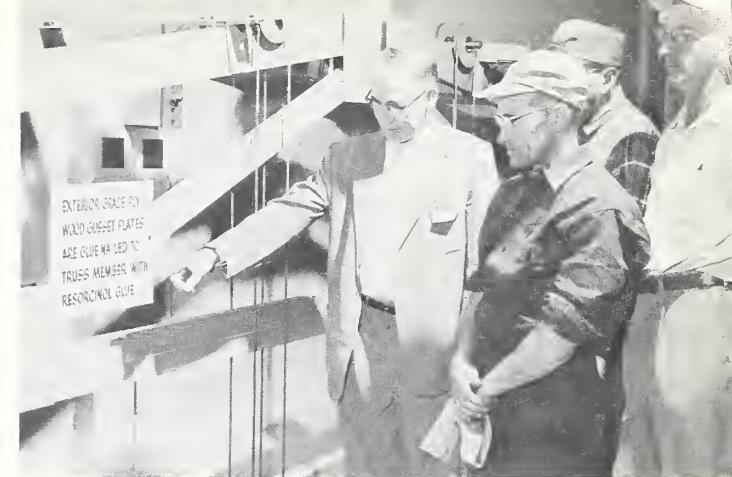
Research on the properties of wood, as affected by use conditions, design considerations, and other factors, is the chief function of the Division of Physics and Engineering. These factors include density, loading conditions, growth characteristics, structure, moisture content, and chemical composition, as well as high and low temperature and chemicals such as preservatives and fire retardants.

Proper engineering design with wood involves the determination of basic strength data for wood of various species and qualities, and for such structural wood products as plywood; the structural design considerations for joints and fastenings for wood and structural elements made of wood; and basic stresses needed by engineers in the design of wood structures.

A large part of physical research on wood involves the removal of moisture from wood, by both natural drying and accelerated seasoning at controlled temperatures and humidities. The effects of removal of moisture, notably the stresses developed that cause checks, splits, casehardening, honeycomb, and warp, are also studied.

Engineering research begins with the strength properties of clear wood. It proceeds to the effects of knots and other wood charac-

SANDWICH construction is made strong and rigid by the addition of glue.

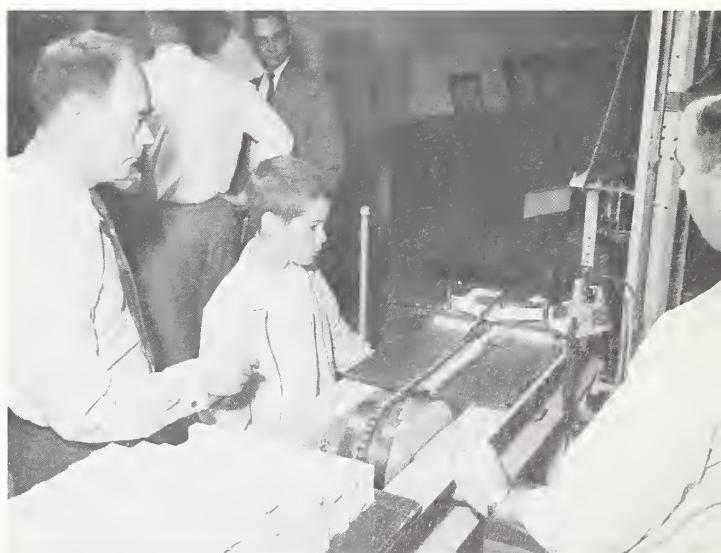


ROOF TRUSSES are subjected to extreme loads to provide design data for engineers, architects, and builders.

teristics on strength, the performance of lumber, plywood, and other materials under various loads, the determination of basic formulas that express wood properties in terms of engineering concepts and the application of these concepts to principles of design.

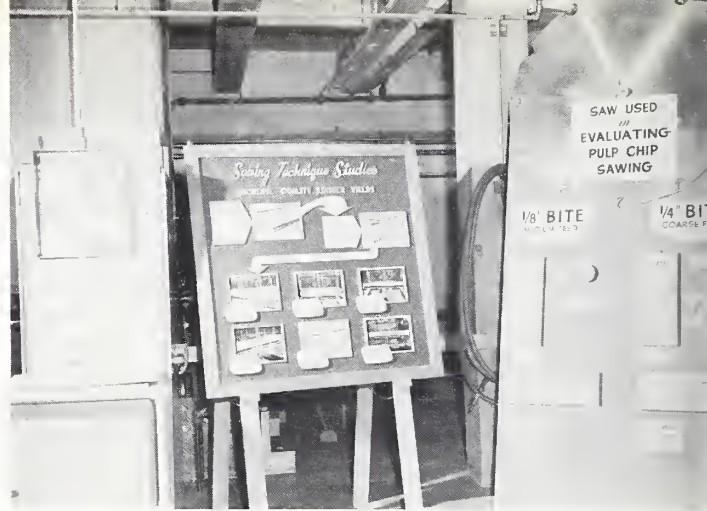
Further research provides design data for efficient engineering utilization of structural timbers; glued laminated members that use species and grades of wood most efficiently; and sandwich and stressed-skin construction for rigid, lightweight structures such as pre-fabricated houses.

BREAKING SPECIMENS attracted men and boys as toughness evaluations were made on the engineering floor.





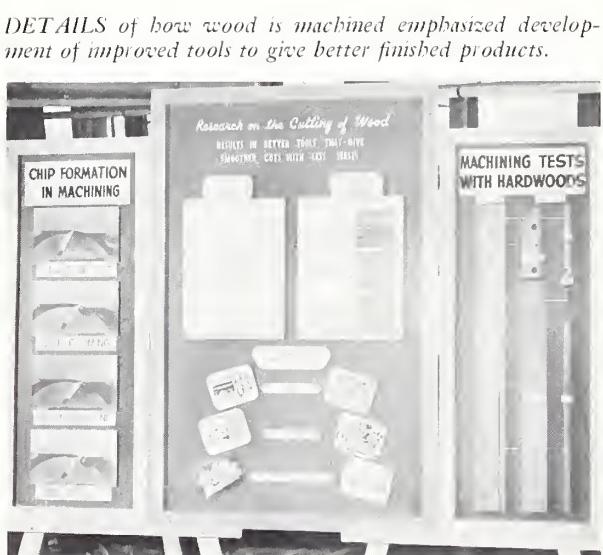
WOOD STRUCTURE was explained visually as seen under the light microscope, and in much more detail under the powerful electron microscope.



RESEARCH on sawing techniques is designed to increase lumber yields while reducing residues.



IDENTIFICATION of various commonly used wood species interested many.



DETAILS of how wood is machined emphasized development of improved tools to give better finished products.

Timber Growth and Utilization Relations

The work of the Division of Timber Growth and Utilization Relations involves wood identification, relation of environmental and genetic factors to the quality of wood produced by trees, machining properties of various species of wood and of wood-base materials such as fiberboard and particle board, fundamental cutting actions of saws and other cutting tools, engineering and economic studies of timber harvesting methods and devices, and related studies of primary processing operations.

Both light and electron microscopes are used in structural studies of wood and its ultimate elements. Such information is used to determine the relationships of structure to quality of wood, its properties and behavior, and to improve the usefulness of lumber, veneer, and pulp products.

An important aspect of this work is the detection of superior strains of trees of a given species from the standpoint of wood quality, in order to guide the selection of seed for future reforestation work and basic improvement of timber quality. Evaluation of increment cores taken from living trees for this purpose is based on established relations of specific gravity, summerwood content, fibril angle, and the like to wood properties. The silvicultural significance of soil, rainfall, and overall climatic conditions to tree growth and wood quality constitutes an important phase of botanical research.



GUN enthusiasts were drawn to the display of exotic wood species made dimensionally stable for stocks by a simple chemical treatment.

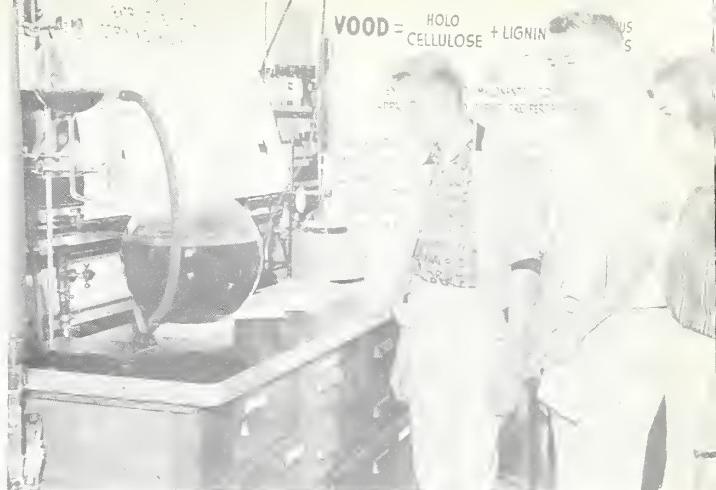
Wood Chemistry

The Division of Wood Chemistry conducts a broad program of research on the fundamental chemistry of wood and its constituents and the development of chemical and microbiological processes for the conversion of wood into useful chemicals. Involved are basic studies of the chemistry of wood cellulose, lignin, bark, and extractives. Processes being investigated include hydrolysis, hydrogenation, fermentation, and distillation to give new or less expensive chemical products, and chemical modification of wood to alter and improve its physical properties, notably dimensional stabilization. Research on such fundamentals as the nature of adhesion and the passage of vapors and liquids through the submicroscopic structure of wood is also part of the program.

Research on the chemical conversion of wood is aimed at establishing the basic factors that control rate and yield of chemical products obtained by various reactions. Lignin is re-

CHEMICAL reactions are carried to small-scale operations to prove the processes are sound from both economic and engineering standpoints.

USE OF radio-active tracers in studying how lignin and cellulose are formed in the living tree is explained to a rapt audience.



DISPLAYS illustrating how wood is studied chemically appealed to students with an inclination toward a scientific future.

moved from wood by such means as hydro-tropic solvents, leaving the cellulose and hemicelluloses free for hydrolysis or other types of reactions. Research is also done on the utilization possibilities of the resultant lignins.

Microbiological research is concerned primarily with the yeast fermentation of wood sugars to such products as glycerol, industrial alcohol, and food protein.

Through pilot-plant studies, chemical engineering research is aimed at development of continuous processes, such as the conversion of xylose, a wood sugar, to furfural, the major building block in nylon.

Dimensional stabilization of wood has been carried to the point where its basic principles are well established. Bulking treatments and cross-linking of the cellulose molecules are among the processes developed. Stabilization of nitrocellulose for solid-fuel rocket propellants is also being studied.

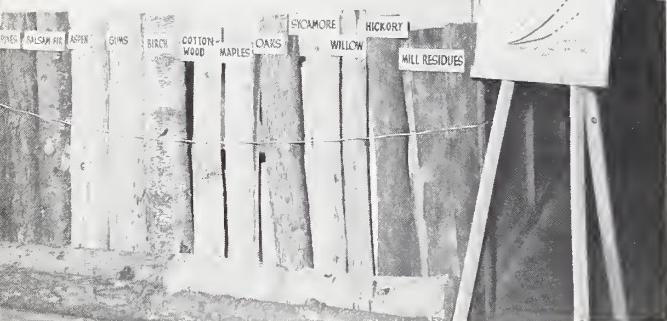


PULP AND PAPER RESEARCH

- FINDS PROFITABLE USES FOR LOW-GRADE WOOD
- OBTAINS MORE PULP FROM A GIVEN AMOUNT OF WOOD
- DEVELOPS NEW AND IMPROVED PRODUCTS

WOODS NOW USED IN GREATEST AMOUNT WILL NOT ALONE SUPPLY FUTURE REQUIREMENTS

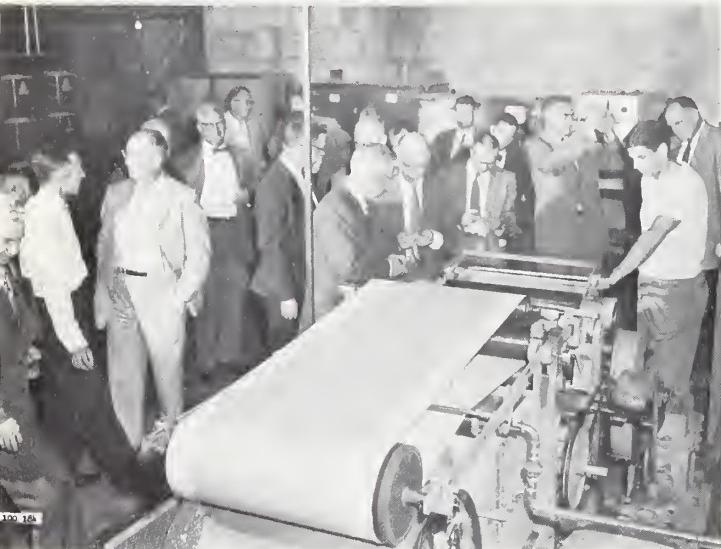
- MORE USE MUST BE MADE OF
- ABUNDANT BROAD-LEAVED SPECIES
- THINNINGS AND LOW-GRADE LOGS
- MILL RESIDUES



FPL processes have increased the number of wood species upon which our future pulp and paper industry can be based.

Pulp and Paper

The objective of the Division of Pulp and Paper is to improve the utilization of wood through research on the pulping characteristics of various woods and the pulps and papers obtainable from them. Development of new and improved pulping processes and the establishment of processing requirements are basic aspects of this research. The raw material base for pulp and paper has been greatly broadened by research that has opened the way to utilization of many species of wood, notably the hardwoods, southern pines, and certain western species. New high-yield neutral sulfite semichemical and cold soda processes developed at the Forest Products Laboratory have greatly increased the pulp tonnage from a given wood supply.



DRAMATIC PROOF of the important role paper plays in the daily life of the average American family is illustrated here. Per capita consumption is now 435 pounds of paper annually.

Pulp quality is improved through research on bleaching and other refining processes, as well as by studies of the fundamental properties of pulp fibers, which are correlated with those of pulp, paper, and allied products. Paper machine processing conditions, such as drainage rates, stuff temperature and consistency, and roll pressure, are investigated to improve production and properties of papers.

The broadening of the species base for pulpwood is carried on nationwide, and is coupled with research on low-quality wood and harvesting and mill residues.

Developmental work to improve pulp and paper products includes such studies as the effects of heat treating on the properties of hardboard; experiments on producing wallboard from coarsely fiberized wood and suitable resins; improving the properties of paper honeycomb core for "sandwich-type" house panels by treatment with various kinds of resins; and making food packaging board and milk-container and shipping-container board from high-yield pulps obtained from low-grade hardwoods.

INDUSTRY technical men examine experimental semichemical pulp made from hardwood at the Forest Products Laboratory. Pulp is here being dewatered for later use in a mixed furnish.



- HAS A COMPRESSIVE STRENGTH VALUE OF ABOUT 9,000 POUNDS
- MADE FROM SEVEN SHEETS OF PAPERBOARD



COMPACT CAR conclusively proves the stacking strength of engineered fiberboard containers. The box was empty

Packaging Research

The development of more efficient containers and packaging methods from wood, paper, and fiberboard is the principal function of the Division of Packaging Research. Projects include design and fabrication of wood and fiber containers and pallets, container fastenings, and cushioning materials. Findings of much of this work have been adopted in packaging regulations, specifications, and trade standards now in wide use, and have helped establish the professional status of packaging as a branch of engineering.

The basic design principles for wood and fiberboard boxes and wood crates have been developed through research relating the strength properties of the component materials--plywood, fiberboard, and so forth--to stresses and loads imposed on containers. As new materials, such as paper-overlaid veneer, are developed, their properties are evaluated and container design factors worked out for them.

VISITORS were amazed at the complexity of the equipment used in measuring energy-absorption characteristics of cushioning materials used in modern packaging.

save for a revolving colored light, visible through holes, to convince skeptics.

Research on container fastenings includes work on rubber, plastics, and adhesives, as well as on such mechanical fasteners as nails, staples, screws, and bolts. Basic research is being done on cushioning design, including development of testing procedures and equipment and analysis of impact data for various types of cushioning materials.



Anniversary Speakers

ERNEST C. BETTS, JR.
Director of Personnel
U.S. Department of
Agriculture



Mr. Betts received his advanced education at Wisconsin state colleges and is a veteran of 21 years of government service. In 1939 he joined the United States Department of Agriculture holding a series of administrative positions, including personnel management, in the Soil Conservation Service, the Office of Budget and Finance, and the Library. From 1950 until 1953 he held posts with the Department of State and the Technical Cooperation Administration both in the United States and abroad. He then returned to the USDA and served on the staff of the Secretary of Agriculture until he was appointed in 1956 to his present position.

W. E. DIFFORD
Executive Vice President
Douglas Fir Plywood
Association



In the 22 years that Mr. Difford has headed the Douglas Fir Plywood Association, he has helped raise production from 650 million to nearly 8 billion square feet a year. A graduate of the University of Chicago and Kent College of Law, Mr. Difford found advertising and business management more intriguing than the practice of law, and soon his business affiliations were studded by managerial successes. He came to the West Coast as managing director of the Fir Door Institute and to direct promotion of the then infant Douglas Fir Plywood Association. Soon his full time was devoted to DFPA, reorganizing its promotion program and instituting industrywide quality control.

CONRAD A. ELVEHJEM
President
University of Wisconsin



Born in a Madison suburb, Dr. Elvehjem has achieved worldwide recognition as a scientist and educator. He received his academic degrees at the university he now heads. A biochemist, he began teaching and research in 1923, gaining international prominence in the late 1930's for his isolation of nicotinic acid and a resultant cure for pellagra. His research has also contributed to knowledge of the functions of iron, copper, and manganese in nutrition, distribution of minor inorganic elements in food, and tissue respiration. He became Dean of the Graduate School in 1946 and the University's thirteenth president in 1958.



GEORGE A. GARRATT
Dean, School of Forestry
Yale University

Dean of Yale University's School of Forestry since 1945, Dr. Garratt holds the chair of Pinchot Professor of Forestry there. A graduate of Michigan State College, he received his master's and Ph. D. degrees from Yale. During 1942-45 he was chief of Technical Service Training at the Forest Products Laboratory for civilian and military members of the armed forces in packaging, aircraft inspection, and related fields. He is a charter member and past president of the Forest Products Research Society, and a fellow and past president of the Society of American Foresters. He has written several technical books and numerous articles.



FRANK J. HANRAHAN
Executive Vice President
American Institute of
Timber Construction

A native of Morris, Minn., Mr. Hanrahan holds bachelor of science and professional civil engineering degrees from Purdue University. He has been active nationally for many years, as chief engineer and deputy director of technical services for the National Lumber Manufacturers Association and more recently as executive vice president of the American Institute of Timber Construction. He has played prominent parts in the development and adoption of standards for glued laminated construction and has served on committees of the American Society for Testing Materials, American Standards Association, and other organizations.



ROBERT A. LACOSSE
Technical Director
Insulation Board Institute

Mr. LaCosse received his bachelor's degrees in structural and engineering construction from Chicago Technical College. He is a Marine Corps veteran of World War II, serving in the Pacific area from 1942 to 1945. Since then he has engaged in structural engineering, including highway, home building, steel, and wood construction. In his present position, he represents the producers of more than 95 percent of the insulation board products made in the United States.

SAMUEL LENHER
Vice President
E. I. du Pont de Nemours
and Company



Dr. Lenher, a Madison native, is a graduate of the University of Wisconsin and holds a Ph. D. degree in chemistry from the University of London, England. In 1926-27 he served as a fellow on the International Education Board in Berlin, Germany. In 1928 he held a research fellowship at the University of California. He has been with Du Pont since 1929, when he joined the firm's research staff as a chemist. He rose steadily to administrative posts in research on organic chemicals and is now vice president and adviser for research. In 1944 he spent a year with the Atomic Energy Commission.

EDWARD G. LOCKE
Director
Forest Products Laboratory



Dr. Locke, a native of Portland, Oregon, was graduated as a chemical engineer from Oregon State College, and received his Ph. D. in organic chemistry from Ohio State University. Before coming to the Laboratory in 1951, he was on the chemical engineering staff at Oregon State College, technical adviser to the Oregon Forest Products Laboratory, and a chemical engineer with Bonneville Power Administration. Joining the Forest Service in 1944, he headed the Portland, Oregon, unit of the Forest Utilization Service at the time of his transfer to the Forest Products Laboratory. A past national president of the Forest Products Research Society, he was Chief of the Laboratory's Division of Wood Chemistry until becoming Laboratory director in 1959.

RICHARD E. McARDLE
Chief, U. S. Forest Service



Dr. McARDLE, a Kentucky native, did his undergraduate and graduate work at the University of Michigan, receiving his Ph. D. there. He began his Forest Service career at the Pacific Northwest Forest and Range Experiment Station. After a 1-year interruption to serve as Dean of the University of Idaho School of Forestry, he became Director of the Rocky Mountain Forest and Range Experiment Station and later of the Appalachian Forest Experiment Station before becoming an assistant chief in 1944. He became Chief of the Forest Service in 1952. He is a fellow of the Society of American Foresters.

STANTON W. MEAD
President
Consolidated Water Power
and Paper Company



After his graduation from Yale University, Mr. Mead began his lifelong career with the Consolidated Water Power and Paper Company. He has been on the Board of Directors continuously since 1927 and became President and General Manager in 1950. He helped found Trees for Tomorrow, Inc., and has been a director of it ever since. From 1950 he has also been a director of the Wisconsin Valley Improvement Company. Last year his firm presented the State of Wisconsin with 20,000 acres of land for wildlife conservation purposes. He is a trustee of Lawrence College, Appleton, Wis., and of the Institute of Paper Chemistry, and has long been active in Boy Scout work.



Honorable
GAYLORD NELSON
Governor of Wisconsin

Governor Nelson, the son of a Wisconsin physician, is a graduate of San Jose State College in California and the University of Wisconsin Law School. He served 4 years in the Army during World War II, including the Okinawa campaign. Since then he has practiced law in Madison and served as a State Senator in the Wisconsin Legislature for 8 years. He was elected Governor in 1958.



Honorable
IVAN A. NESTINGEN
Mayor of Madison

A Wisconsin native, Mayor Nestingen was graduated from the University of Wisconsin Law School. He served with the Army Engineers in the South Pacific during World War II. Before becoming Mayor of Madison in 1956, he practiced law and was a Madison alderman and member of Wisconsin's Legislature.



ERVIN L. PETERSON
Assistant Secretary
of Agriculture

Mr. Peterson was a dairyman and widely known farm leader in his native Oregon before becoming Assistant Secretary of Agriculture in charge of Federal-State relations in 1954. He attended the University of California at Los Angeles, and then returned to Oregon to farm 10 years. During that time he was prominent in the Grange and the Oregon Dairymen's Association. He served as county judge of Coos County, Oregon, for 2 years and was director of the Oregon State Department of Agriculture from 1943 to 1954. He was president of the National Association of Secretaries, Commissioners, and Directors of Agriculture in 1948.



GEORGE E. PRICE
President
National Homes,
Incorporated

Educated at Purdue and Indiana Universities, Mr. Price has, with his brother James, built the largest pre-fabricated home manufacturing firm in the Nation, National Homes, Inc., of Lafayette, Ind. As president of that firm, he directs its sales staff and supervises relations with its nearly 1,000 dealers. With his brother, he also operates a construction firm, Price and Price, that has built about 4,000 homes in the Lafayette area. He served two terms as President of the Prefabricated Home Manufacturers Institute, predecessor of the Home Manufacturers Association.



FREDERICK K.
WEYERHAEUSER
Chairman of the Board
The Weyerhaeuser Company

Mr. Weyerhaeuser heads one of the largest and most diversified forest products manufacturing concerns in the United States. Begun as a lumbering firm in the Middle West during the nineteenth century, The Weyerhaeuser Company expanded nationwide as well as in the variety of its products, which now include plywood, pulp, paperboard, containers, adhesives, and a variety of fiber and chemical products. Mr. Weyerhaeuser, an Illinois native, was graduated from Yale University and served as an Army bomber pilot in Italy in World War I. His career with the family firm began with a lumbering operation in Idaho and has been largely in sales work. He became board chairman in 1955, but became company president in 1956 upon the death of a brother, J. P. Weyerhaeuser, Jr. He resumed the board chairmanship this year.

HOWARD E. WHITAKER
Chairman of the Board
The Mead Corporation
and President, American
Paper and Pulp Association



Mr. Whitaker joined the technical service staff of the Mead Corporation in Chillicothe, Ohio, the same year he obtained his master's degree in chemical engineering from Massachusetts Institute of Technology. He moved steadily through a number of technical and administrative positions to become President in 1952 and Chairman of the Board in 1957. This year he was elected President of the American Paper and Pulp Association. He is a trustee of the Institute of Paper Chemistry and a member of the National Board, Boy Scouts of America, among other positions.



WALTER H. SWANSON
Vice President,
Research and Development
Kimberly-Clark Corporation

Mr. Swanson, a native of Illinois, holds a B.S. degree from the University of Minnesota and an M.S. from the University of Wisconsin. He was an assistant technologist in the Pulp and Paper Division of the Forest Products Laboratory from 1920 to 1926, and did outstanding work with R. N. Miller on the technology of sulfite pulping. This work established his reputation in the industry. He joined the research staff at Kimberly-Clark after a short stay at the Champion Fiber Co., and rose to his present position in 1953. He is a past president of TAPPI, and also is active in AIChE and the Paper Industry Manager's Association.

Commemorative Plaques



For distinguished achievements
in pulp and paper research, notably
Semicontinuous and Cold Soda processes
that greatly enhance the utility of
hardwoods, this plaque is presented

THE FOREST PRODUCTS LABORATORY
on its Golden Anniversary

June 2-4, 1960

AMERICAN PAPER AND PULP ASSOCIATION

For pioneering research and development
of plywood for exterior use, as exemplified
in the walls of this building

erected in 1934-35.

THE DOUGLAS FIR PLYWOOD ASSOCIATION
presents this plaque commemorating
the GOLDEN ANNIVERSARY of the
U.S. FOREST PRODUCTS LABORATORY

June 2-4, 1960

For pioneering research that laid
the technological basis for the
glued laminated timber industry.

**THE AMERICAN INSTITUTE OF
TIMBER CONSTRUCTION**
presents this plaque to commemorate
the GOLDEN ANNIVERSARY of the
U.S. FOREST PRODUCTS LABORATORY

June 2-4, 1960



U.S. Forest Products Laboratory
GOLDEN
ANNIVERSARY
1910-1960

DR. EDWARD D. LOCKE
Director

RESOLUTION

Whereas the United States Forest Products Laboratory is celebrating the Golden Anniversary of its founding; and

Whereas its facilities and personnel have contributed such outstanding, unstinted assistance; and

Whereas the Golden Anniversary program is to be held June 2, 3 and 4, at the Forest Products Laboratory, Madison, Wisconsin; be it therefore

Resolved that the American Wood-Preservers' Association in meeting assembled gratefully acknowledge its indebtedness, and extend its best wishes for continued success and that copies of this Resolution appear as a part of the minutes of this meeting and that a copy thereof be tendered Dr. E. D. Locke, Director.

DATED APRIL 27, 1960

Presented on Behalf of the American Wood-Preservers' Association

Date: June 3, 1960

J. M. Gund

In recognition of
A HALF-CENTURY
of outstanding accomplishments
in the field of wood research,
development and
technological services

The Lumber and Wood Products
Industries Congratulate

THE U. S. FOREST PRODUCTS
LABORATORY

on its

50th Anniversary

NATIONAL LUMBER MANUFACTURERS
ASSOCIATION

June 2nd, 1960

Forest Products Laboratory

On the Occasion of its
50th Anniversary

Whereas, the Forest Products Laboratory is celebrating its Fiftieth Anniversary, and

Whereas, during its long and dedicated service it has made innumerable contributions to the entire construction industry as well as the forest product industries, particularly in the field of scientific research with outstanding accomplishments in improving existing products and developing new products for all segments of the forest industries, and

Whereas, the Insulation Board Industry has benefited in substantial measure from these accomplishments:

Now, Therefore, be it

Resolved, that the officers and members of the Insulation Board Institute tender to the Forest Products Laboratory, their warm thanks and grateful appreciation for its many contributions to the Insulation Board Industry and their best wishes for its continued success in the years ahead, and, furthermore, that this Resolution be spread upon the records of the Institute and a copy thereof be suitably engrossed and presented to the Forest Products Laboratory.

Citation for Outstanding Achievement

presented by the

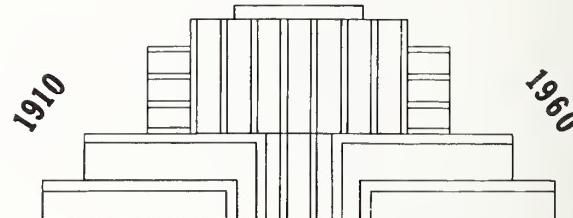
HOME MANUFACTURERS ASSOCIATION



on its Golden Anniversary

June 2-10, 1960

For basic research and development
of the stressed-skin system of engineered house construction



A SALUTE
TO THE
FOREST PRODUCTS LABORATORY
UPON THE COMPLETION OF
FIFTY YEARS OF ACHIEVEMENT
FROM
THE DIVISIONS OF ENGINEERING
FOREST SERVICE

Anthony P. Dean
Director

- | | | | |
|-----|-----------------------|------|-----------------------|
| R-1 | <i>Arnold Carlson</i> | R-6 | <i>R. E. Grede</i> |
| R-2 | <i>E. Remington</i> | R-7 | <i>Boyd O. Luber</i> |
| R-3 | <i>E. R. Huber</i> | R-8 | <i>W. H. Steffner</i> |
| R-4 | <i>S. W. Buckley</i> | R-9 | <i>M. B. Arthur</i> |
| R-5 | <i>L. G. Kennedy</i> | R-10 | <i>H. L. Miller</i> |

THE STATE OF WISCONSIN



CITATION BY THE LEGISLATURE

Know you by these presents,

Whereas, the U.S. FOREST PRODUCTS LABORATORY, which was founded on the campus of the University of Wisconsin by the Forestry Service of the U.S. Department of Agriculture in 1910, has gained a world-wide reputation as a model of scientific research and has provided substantial assistance in the rehabilitation of Wisconsin's timber resources; now, therefore, be it

Resolved by the WISCONSIN LEGISLATURE on the motions of ASSEMBLYMAN RICHARD L. CATES and SENATOR ROBERT P. KNOWLES, That the U.S. FOREST PRODUCTS LABORATORY in Madison, Wisconsin, be congratulated on this, the fiftieth year since the founding of the laboratory.

Norman E. Duderison
Chief Clerk

George W. Ladd
Speaker of the Assembly
Phil M. L.
Lieutenant Governor

June 8, 1960
Date

The Finnish Pulp and Paper Research Institute offers the most cordial congratulations to

THE U.S. FOREST PRODUCTS LABORATORY
on the occasion of its 50th Anniversary,
and extends the best wishes for further success in its important work.

R. Erik Serlachius
R. ERIK SERLACHIUS
Chairman of the Board

Waldemar Jensen
WALDEMAR JENSEN
Managing Director

Resolution of Commendation

to the

United States Forest Products Laboratory

Whereas the United States Forest Products Laboratory pioneered in the research that laid the technological basis for modern engineered timber construction including glued laminated timber and -

Whereas the generations of men and women who have staffed the United States Forest Products Laboratory faithfully advanced forest conservation and forest products both in the government and in industry for the benefit of the public and -

Whereas the work of the United States Forest Products Laboratory has helped provide broader, more effective use of a vital natural resource thus strengthening the whole economy and -

Whereas the United States Forest Products Laboratory is now celebrating the Golden Anniversary of its foundation;

Be it resolved that the members of the American Institute of Timber Construction salute and compliment the United States Forest Products Laboratory on its indispensable work and its many contributions.

Be it further resolved that this resolution of appreciation be commemorated by a suitably inscribed plaque, and this plaque be presented to the United States Forest Products Laboratory on the occasion of its 50th Anniversary,

June 4, 1960



For: The American Institute of Timber Construction

By: *Frank J. Hanrahan*
Frank J. Hanrahan
Executive Vice President

Die Deutsche Gesellschaft für Holzforschung

entbietet dem

U.S. Forest Products Laboratory

in Madison, Wisconsin

anlässlich seines 50-jährigen Bestehens

am 2. Juni 1960

aufrichtige Glückwünsche zugleich mit dem Ausdruck

hoher Anerkennung und warmen Dankes

für seine grossartigen Leistungen auf allen Gebieten

grundlegender und angewandter Holzforschung,

sie wünscht Glück und Erfolg auch für die Zukunft

im Interesse blühender Forstwirtschaft und Holzwirtschaft

in aller Welt.

DER PRÄSIDENT

Johann

DAS PRÄSIDIUM

François Henri Hollenstein *J. Mann*

List of Attendees

Name	Company	City & State
Mr. & Mrs. Allen Abrams	: Consultant, Arthur D. Little	: Wausau, Wis.
Mr. Roy R. Ahonen	: Ahonen Lumber Company	: Ironwood, Mich.
Mr. J. B. Albee	: Maple Flooring Mfrs. Assoc.	: Chicago, Ill.
Mr. Arthur B. Anderson	: Univ. of California - FPL	: Richmond, Calif.
Mr. Bruce E. Anderson	: Army Ordnance Office	: Washington, D.C.
Mr. Eric A. Anderson	: College of Forestry	: Syracuse, N.Y.
Mr. H. E. B. Anderson	: Plant Engineering	: Barrington, Ill.
Mr. O. E. Anderson	: International Paper Company	: Pelham, N.Y.
Mr. John L. Aram	: Weyerhaeuser Company	: Tacoma, Wash.
Miss Saara Asunmaa	: Stanford University	: Stanford, Calif.
Mr. Rolland Aubey	: Nekoosa-Edwards Paper Co.	: Port Edwards, Wis.
Mr. W. C. Barrier	: Natl. Hardwood Lbr. Assoc.	: Chicago, Ill.
Mr. Paul E. Baseler	: Building Officials Conference	:
Mr. A. Allan Bates	: of America, Inc.	: Chicago, Ill.
Mr. & Mrs. John A. Beale	: Portland Cement Association	: Skokie, Ill.
Mr. A. M. Beining	: Wisconsin Conservation Dept.	: Madison, Wis.
Dr. & Mrs. D. W. Bensend	: Borden Chemical Company	: Marshfield, Wis.
Mr. & Mrs. Raymond H. Berry	: Iowa State University	: Ames, Iowa
Mr. Ralph H. Bescher	: Scott Lumber Company, Inc.	: Burney, Calif.
Mr. James S. Bethel	: Koppers Company, Inc.	: Pittsburgh, Pa.
Mr. R. A. Biermann	: National Science Foundation	: Washington, D.C.
Mrs. Melvin F. Bonn	: Borden Chemical Company	: Elmhurst, Ill.
Mr. C. M. Bonnell, Jr.	: General Federation of	:
Mr. George T. Boyle	: Women's Clubs	: Bloomington, Wis.
Mr. R. H. Bliss	: Packing and Shipping	: Plainfield, N.J.
Mr. Lars C. Bratt	: Minn. Mining & Mfg. Co.	: Park Ridge, Ill.
Mrs. Mark W. Bray	: United Shoe Machinery Corp.	: Boston, Mass.
Mr. P. L. Breakiron	: Stanford Research Institute	: Menlo Park, Calif.
Mr. Gene C. Brewer	:	: Madison, Wis.
Mr. P. A. Briegleb	: U.S. Dept. Agr.	: Washington, D.C.
Mr. E. J. Brown	: United States Plywood Corp.	: New York, N.Y.
Mr. Henry A. Bruns	: Southern Station, F.S.	: New Orleans, La.
Mr. L. B. Buchanan	: Amer. Railway Eng. Assoc.	: Chicago, Ill.
Mr. & Mrs. Bruce G. Buell	:	: Madison, Wis.
Mr. A. S. Bull	: Chicago Mill & Lumber Co.	: Chicago, Ill.
Mr. Warren Burger	: Marathon Corporation	: Menasha, Wis.
Mr. C. W. Burrage	: Insulite Div., M & O Paper Co.	: Minneapolis, Minn.
Mr. & Mrs. J. O. Burton	: U.S. Dept. Agr., Barley &	:
Mr. James Byrne, Jr.	: Malt Lab	: Madison, Wis.
Mr. Douglas E. Campbell	: GM & O R.R.	: Louisville, Miss.
Mr. & Mrs. Earl B. Candell	: Minn. & Ontario Paper Co.	: Minneapolis, Minn.
Dr. S. M. Cantor	:	: Washington, D.C.
	: Pulp Chemicals Association	: New York, N.Y.
	:	: Shaker Heights, Ohio
	: Sidney M. Cantor Associates	: Ardmore, Pa.

Name	Company	City & State
Mr. J. Roland Carr	:Engineering News Record	:Chicago, Ill.
Mr. E. G. Champagne	:Central States Station, F.S.	:Columbus, Ohio
Mr. F. J. Champion	:	:Centralia, Wash.
Mr. A. D. Chapman	:Chapman Chemical Company	:Memphis, Tenn.
Mr. P. C. Christiansen	:Northern Hardwood and Pine	:
	: Manufacturers Association	:Phelps, Wis.
Mr. & Mrs. James R. Clark	:Soderhamn Machine Company	:Birmingham, Ala.
Mr. Victor H. Clausen	:Simpson Redwood Company	:Arcata, Calif.
Mr. Henry Clepper	:Society of American Foresters	:Washington, D.C.
Mr. Joseph A. Connor	:Seventh U.S. Civil Service	:
	: Region	:Chicago, Ill.
Mr. Neil Connor	:Federal Housing Administration	:Washington, D.C.
Mr. Henry C. Crandall	:Mosinee Paper Company	:Mosinee, Wis.
Dr. & Mrs. L. W. Crandall	:University of Wisconsin	:Madison, Wis.
Mr. J. A. Crozier	:Poinsett Lbr. & Mfg. Company	:Trumann, Ark.
Mr. Samuel T. Dana	:University of Michigan	:Ann Arbor, Mich.
Miss Elizabeth Davenport	:Secretary to R. H. Berry,	:
Miss E. M. Pearl Dennis	: Scott Lumber Company, Inc.	:Burney, Calif.
Mr. John Devine	:	:Madison, Wis.
Mr. M. B. Dickerman	:Moore Dry Kiln Company	:Jacksonville, Fla.
Dr. F. E. Dickinson	:Lake States Station, F.S.	:St. Paul, Minn.
Mr. R. F. Droege	:University of California - FPL	:Richmond, Calif.
Mr. & Mrs. John T. Drow	:Region 9, F.S.	:Milwaukee, Wis.
Mr. & Mrs. H. R. Duncan	:U.S. Forest Service	:Washington, D.C.
Mr. & Mrs. M. E. Dunlap	:C.B. & Q. Railroad Company	:Chicago, Ill.
Mr. & Mrs. A. P. Dunlop	:	:Madison, Wis.
Mr. & Mrs. Paul M. Dunn	:The Quaker Oats Company	:Barrington, Ill.
	:St. Regis Paper Company	:New York, N.Y.
Mr. Eric L. Ellwood	:University of California - FPL	:Richmond, Calif.
Mr. Armin Elmendorf	:Elmendorf Research Inc.	:Palo Alto, Calif.
Mr. George H. Englerth	:U.S. Forest Service	:Rio Piedras, Puerto Rico
Mr. L. N. Erickson	:Pacific Southwest Station, F.S.	:Berkeley, Calif.
Mr. Gordon A. Erickson	:Wood Conversion Company	:St. Paul, Minn.
Mr. Harold Evans	:Plywood Research Foundation	:Tacoma, Wash.
Mr. D. L. Fassnacht	:Southern Station, F.S.	:New Orleans, La.
Mr. Paul J. Fenn	:Tell City Chair Company	:Tell City, Ind.
Mr. & Mrs. Ray E. Frase	:Signode Steel Strapping Co.	:Chicago, Ill.
Prof. R. K. Froker	:University of Wisconsin	:Madison, Wis.
Mr. Hereford Garland	:Michigan College of Mining	:
	: and Technology	:Houghton, Mich.
Dr. Eloise Gerry	:	:Madison, Wis.
Mr. H. L. Gibson	:Wisconsin Power & Light Co.	:Madison, Wis.
Mr. & Mrs. A. W. Goos	:Cliffs Dow Chemical Company	:Marquette, Mich.
Mr. Lyle J. Gordon	:Scott Paper Company	:Everett, Wash.
Mr. John B. Grantham	:Pacific Northwest Station, F.S.	:Portland, Oreg.
Dr. Stanley S. Gregory	:Weyerhaeuser Company	:Longview, Wash.
Mr. G. J. Grieshaber	:The Stearns & Foster Co.	:Lockland, Cincinnati, Ohio

Name	Company	City & State
Miss Annette Hafemeister	:Region 9, F.S.	:Milwaukee, Wis.
Dr. J. A. Hall	:	:Portland, Oreg.
Mr. & Mrs. Frank J. Hallauer	:	:Madison, Wis.
Mr. & Mrs. M. C. Hanisch, Jr.	:Unit Structures, Inc.	:Peshtigo, Wis.
Mr. Mace V. Harris	:Northwest Paper Company	:Cloquet, Minn.
Mr. W. H. Hartley	:Hobart Manufacturing Co.	:Troy, Ohio
Mr. & Mrs. A. F. Healy	:U.S. Dept. Agr. - Agr. : Research Service	:
Mr. L. C. Heller	:Office of Navy Materiel	:Washington, D.C.
Mr. Clark C. Heritage	:Consulting Engineer	:Tacoma, Wash.
Mr. L. C. Hermel	:Region 9, F.S.	:Milwaukee, Wis.
Mr. Franklin W. Herrick	:Rayonier, Inc.	:Shelton, Wash.
Mr. R. J. Hill	:C & NW Railway	:Chicago, Ill.
Dr. Harry Hochman	:U.S. Naval Civil Eng. Lab.	:Port Hueneme, Calif.
Mr. Edgar P. Hoener	:	:Portland, Oreg.
Miss Ellen Hoffman	:	:Madison, Wis.
Mr. A. S. Holden	:The Coe Manufacturing Co.	:Painesville, Ohio
Mr. Rahe O. Hornung	:Mississippi Valley Association	:Chicago, Ill.
Prof. & Mrs. O. A. Hougen	:University of Wisconsin	:Madison, Wis.
Mr. Neal D. Howard	:Amer. Railway Eng. Assoc.	:Chicago, Ill.
Mr. C. E. Hrubesky	:	:Mt. Center, Calif.
Mr. Donald T. Jackson	:Hammermill Paper Company	:Erie, Pa.
Mr. R. L. Jenk	:The Mead Corporation	:Cincinnati, Ohio
Mr. & Mrs. Herbert A. Jensen	:Hammon, Jensen & Wallen	:Oakland, Calif.
Mr. A. H. Johnson	:American Bowling Congress	:Milwaukee, Wis.
Mr. Carl Johnson	:Federal Housing Administration	:Washington, D.C.
Mr. R. P. A. Johnson	:	:Madison, Wis.
Mr. S. I. Kalmich	:Plastofilm Inc.	:Wheaton, Ill.
Mr. William Kelso	:University of Minnesota	:St. Paul, Minn.
Mr. F. G. Kilp	:Nekoosa-Edwards Paper Co.	:Port Edwards, Wis.
Mr. Ray Kirvin	:Kraft Paper Association	:New York, N.Y.
Mr. Laurance Kitchin	:Marathon Corporation	:Menasha, Wis.
Mr. & Mrs. Noel E. Kittell	:Joslyn Mfg. and Supply Co.	:Chicago, Ill.
Mr. William A. Kluender	:C & NW RR	:Chicago, Ill.
Mr. & Mrs. Albert H. Knabb	:The Associated Cooperage	:
Mr. Lloyd D. Knapp	: Industries of America, Inc.	:St. Louis, Mo.
Mr. & Mrs. Archie Knauss	:Amer. Soc. of Civil Engineers	:Milwaukee, Wis.
Mr. R. G. Knechtges	:Pacific Northwest Station, F.S.	:Portland, Oreg.
Mr. E. S. Kotok	:Packaging Corp. of America	:Filer City, Mich.
Prof. T. T. Kozlowski	:Intermountain Station, F.S.	:Ogden, Utah
Mr. W. A. Krasko	:University of Wisconsin	:Madison, Wis.
Mr. Howard Krickl	:Columbia Cellulose Co., Ltd.	:Vancouver, B.C.
Mr. John G. Kuenzel	:Vulcan Containers, Inc.	:Bellwood, Ill.
Prof. James E. Kuntz	:Department of the Navy	:Washington, D.C.
Mr. Arthur Lahey	:University of Wisconsin	:Madison, Wis.
Mr. & Mrs. E. L. Lamb	:Weyerhaeuser Company	:St. Paul, Minn.
Mr. O. C. Lance	:Minn. & Ontario Paper Co.	:Minneapolis, Minn.
	:Natl. Woodwork Mfrs. Assoc.	:Chicago, Ill.

Name	Company	City & State
Mr. F. A. Lawrence	Durez Plastics Division - : Hooker Chemical Corp.	: :North Tonawanda, N.Y.
Mr. M. M. Lehrbas	:Southern Station, F.S.	:New Orleans, La.
Mrs. Aldo Leopold	:	:Madison, Wis.
Dr. Menachem Lewin	:Institute for Fibres and : Forest Products Research	:
Mr. Richard Lincoln	:Outboard Marine Research	:Jerusalem, Israel
Mr. C. R. Lockard	:U.S. Forest Service	:Milwaukee, Wis.
Mr. Charles E. Loucks	:National Paint, Varnish and : Lacquer Assoc., Inc.	:Washington, D.C.
Mr. Leo J. Lovett	:Singer Manufacturing Company	:
Mr. & Mrs. R. F. Luxford	:	:Washington, D.C.
Mr. Vern I. McCarthy, Jr.	:Vulcan Containers, Inc.	:New York, N.Y.
Mr. Clark E. McDonald	:Hardwood Plywood Institute	:Madison, Wis.
Dr. W. G. McGinnies	:Central States Station, F.S.	:Washington, D.C.
Mr. & Mrs. G. S. McIntire	:Department of Conservation, : State of Michigan	:
Dr. Herbert B. McKean	:Potlatch Forests, Inc.	:Lansing, Mich.
Mr. James P. McWilliams	:U.S. Tariff Commission	:Lewiston, Idaho
Mr. Wm. M. MacConnachie, Jr.	:Northwest Paper Company	:Washington, D.C.
Mr. R. G. Macdonald	:Tech. Assn. Pulp and Paper : Industry	:Cloquet, Minn.
Mr. & Mrs. George E. Mackin	:Green Bay Paper & Pulp Co.	:
Mr. H. W. March	:	:New York, N.Y.
Mr. & Mrs. L. J. Markwardt	:	:Green Bay, Wis.
Mr. Ralph W. Marquis	:	:Madison, Wis.
Mr. A. Fletcher Marsh	:	:Madison, Wis.
Mr. T. T. Martin	:Northeastern Station, F.S.	:Upper Darby, Pa.
Mr. C. G. W. Mason	:Marsh & Truman Lbr. Co.	:Chicago, Ill.
Miss Elizabeth Mason	:GM & O R.R.	:Mobile, Ala.
Mr. D. J. Massoglia	:New Zealand Forest Service	:Wellington, New Zealand
Mr. & Mrs. James S. Mathewson	:U.S. Forest Service	:Washington, D.C.
Dr. & Mrs. V. W. Meloche	:Timber Producers Association	:Calumet, Mich.
Mr. Carl Menzel	:	:Madison, Wis.
Mr. Ross Miller	:University of Wisconsin	:Madison, Wis.
Mr. Wm. H. Monsson	:	:Homewood, Ill.
Mr. & Mrs. F. M. Moores	:Soil Conservation Service	:Madison, Wis.
Mr. Harry S. Mosebrook	:Hooker Chemical Corporation	:Niagara Falls, N.Y.
Mrs. T. J. Moseley	:Nebraska Bridge Supply and : Lumber Company	:
Mr. Don Mowry	:Weyerhaeuser Company	:Omaha, Nebr.
Mr. & Mrs. R. J. Muckenhirm	:	:St. Paul, Minn.
Mr. & Mrs. Arthur F. Muschler	:American Ladder Institute	:Madison, Wis.
Mr. Arthur Naumann	:University of Wisconsin	:Chicago, Ill.
Mr. E. H. Neese, Jr.	:Edward Hines Lumber Co.	:Madison, Wis.
Mr. M. M. Nelson	:U.S. Corps of Engineers	:Chicago, Ill.
Mr. & Mrs. H. C. Nicholls	:Beloit Iron Works	:St. Louis, Mo.
Mr. & Mrs. R. A. Nugent	:Region 9, F.S.	:Beloit, Wis.
	:Consolidated Water Power : and Paper Company	:Milwaukee, Wis.
	:Nekoosa-Edwards Paper Co.	:
		:Wisconsin Rapids, Wis.
		:Port Edwards, Wis.

Name	Company	City & State
Mr. J. E. O'Brien	Rural Electrification Admin.	:Washington, D.C.
Mr. W. H. O'Brien	:Southern Pine Association	:New Orleans, La.
Mr. Herbert E. Ochsner	:Region 9, F.S.	:Milwaukee, Wis.
Mr. Richard M. Oliver	:Aerospace Industries Assoc. : of America, Inc.	:
Mr. Howard Olson	:Sonford Products	:Washington, D.C.
Dr. A. J. Panshin	:Michigan State University	:Minneapolis, Minn.
Mr. K. R. Parker	:Joslyn Mfg. and Supply Co.	:East Lansing, Mich.
Mr. D. E. Parsons	:National Bureau of Standards	:Chicago, Ill.
Mr. & Mrs. Benson H. Paul	:	:Washington, D.C.
Dr. & Mrs. Irwin A. Pearl	:Institute of Paper Chemistry	:Madison, Wis.
Mr. M. B. Pendleton	:Natl. Hardwood Lbr. Assoc.	:Appleton, Wis.
Mr. T. R. Peterson	:United Shoe Machinery Corp.	:Chicago, Ill.
Mr. Ted Peterson	:University of Wisconsin	:Boston, Mass.
Mr. Ray Platow	:United States Plywood Corp.	:Madison, Wis.
Mr. Earl Porter	:International Paper Company	:New York, N.Y.
Mr. Stephen B. Preston	:University of Michigan	:Mobile, Ala.
Mr. Alan S. Price	:	:Ann Arbor, Mich.
Mr. R. B. Putman	:Koppers Company, Inc.	:Castleford, England
Mr. & Mrs. Owen Pyle	:Kingsford Chemical Co.	:Pittsburgh, Pa.
Mr. E. L. Rastatter	:	:Iron Mountain, Mich.
Mr. & Mrs. Maurice J. Rhude	:The Bauer Brothers Company	:Springfield, Ohio
Mr. Dan Richmond	:Unit Structures, Inc.	:Peshtigo, Wis.
Mr. C. A. Rinehimer	:Region 6, F.S.	:Portland, Oreg.
Dr. George J. Ritter	:Rinehimer Bros. Mfg. Co.	:Elgin, Ill.
Mr. Arthur K. Roberts	:	:Madison, Wis.
Mr. & Mrs. William H. Roddis	:West Coast Lumbermen's Assn.	:Portland, Oreg.
Mr. Harry L. Russell	:Roddis Plywood Corporation	:Marshfield, Wis.
Mr. Harry L. Russell	:Russell Dry Kiln Company	:Fordyce, Ark.
Mr. William H. Scheick	:	
Mr. George A. Schlageter	:Timber Engineering Company	:Washington, D.C.
Mr. A. P. Schnyder	:Outboard Marine Research	:Milwaukee, Wis.
Dr. & Mrs. A. W. Schorger	:The Lummus Company	:New York, N.Y.
Mr. H. Schwartz	:	:Madison, Wis.
Mr. Paul R. Schwartz	:Forest Products Laboratories	:
Mr. M. F. Schweers	: of Canada	:Ottawa, Canada
Mr. Robert J. Seidl	:Chicago Mill & Lbr. Company	:Tallulah, La.
Dr. Frederic R. Senti	:U.S. Dept. Agr. - Soil	:
Mr. & Mrs. A. C. Shaw	: Conservation Service	:Madison, Wis.
Mr. Leonard Shay	:Simpson Timber Company	:Seattle, Wash.
Mrs. Earl Sherrard	:U.S. Dept. Agr. - Agr.	:
Mr. Sam Sievers	: Research Service	:Peoria, Ill.
Dr. F. E. Siimes	:Champion Paper & Fibre Co.	:Hamilton, Ohio
Mr. & Mrs. Kenneth E. Skidmore	:Timber Producers Association	:Calumet, Mich.
Mr. Harvey H. Smith	:	:Madison, Wis.
Mr. Walton R. Smith	:Johnson's Wax	:Racine, Wis.
Mr. J. Walter Snavely	:The State Institute for	:
	: Technical Research	.Helsinki, Finland
	:	:Madison, Wis.
	:Pacific Southwest Station, F.S.	:Berkeley, Calif.
	:Southeastern Station, F.S.	:Asheville, N.C.
	:Chain Belt Company	:Milwaukee, Wis.

Name	Company	City & State
Mr. B. F. (Ben) Springer	:Order of Hoo-Hoo	:Milwaukee, Wis.
Mr. & Mrs. J. A. Staidl	:Consultant	:Madison, Wis.
Dr. & Mrs. A. J. Stamm	:North Carolina State College	:Raleigh, N.C.
Mr. & Mrs. B. J. Staneslow	:Moore Business Forms, Inc.	:Niagara Falls, N.Y.
Mr. & Mrs. Carl E. Steiger	:	:Oshkosh, Wis.
Mr. R. T. Steindorf	:Chain Belt Company	:Milwaukee, Wis.
Mr. E. A. Stone	:The Coe Manufacturing	:Painesville, Ohio
Mr. N. S. Stone	:Mosinee Paper Company	:Mosinee, Wis.
Dr. R. E. Stutz	:Chapman Chemical Company	:Memphis, Tenn.
Mr. E. J. Sullivan	:Borden Chemical Company	:New York, N.Y.
Mrs. Carroll V. Sweet	:	:Madison, Wis.
Mr. Hall R. Templeton	:Herbert A. Templeton Lbr. Co.	:Portland, Oreg.
Mr. C. K. Textor	:Bauer Brothers Company	:Springfield, Ohio
Mr. & Mrs. Charles C. Thompson	:Fitzpatrick Lumber Company	:Madison, Wis.
Mr. E. A. Thronson	:E.I. du Pont de Nemours & Co.	:Wilmington, Del.
Mr. & Mrs. F. P. Tierney	:Northern States Power Co.	:Minneapolis, Minn.
Mr. & Mrs. Arlie W. Toole	:Lake States Station, F.S.	:St. Paul, Minn.
Prof. & Mrs. F. B. Trenk	:University of Wisconsin	:Madison, Wis.
Mr. T. R. Truax	:	:Madison, Wis.
Mr. C. E. Twitchell	:Minn. Mining & Mfg. Co.	:St. Paul, Minn.
Mr. & Mrs. J. C. Van Dyke	:Unit Structures, Inc.	:Peshtigo, Wis.
Mrs. Arthur Van Kleeck	:	:Madison, Wis.
Mr. John Van Moss, Jr.	:Starwood Industries	:Chicago, Ill.
Mr. T. S. Veazey	:The Anaconda Company	:Butt, Mont.
Mr. H. F. Wakefield	:Bakelite Company	:New York, N.Y.
Mr. P. H. Waller	:Starwood Industries	:Chicago, Ill.
Mr. & Mrs. Kyle Ward, Jr.	:Institute of Paper Chemistry	:Appleton, Wis.
Mr. & Mrs. J. R. Watkins	:	:Peoria, Ill.
Mrs. Howard F. Weiss	:	:Madison, Wis.
Dean Kurt F. Wendt	:University of Wisconsin	:Madison, Wis.
Mr. R. W. Wellwood	:University of British Columbia	:Vancouver, B.C.
Mr. R. H. Westveld	:University of Missouri	:Columbia, Mo.
Mr. Teel Williams	:Mahogany Association	:Chicago, Ill.
Mr. F. G. Wilson	:	:Madison, Wis.
Mr. Paul H. Wilson	:Minn. Mining & Mfg. Co.	:St. Paul, Minn.
Mr. & Mrs. William K. Wilson	:National Bureau of Standards	:Washington, D.C.
Mr. & Mrs. U. J. Winterhalter	:Ford Motor Company	:Dearborn, Mich.
Mr. Chalres Winton	:Winton Lumber Company	:Minneapolis, Minn.
Mr. & Mrs. John Witherspoon	:Weyerhaeuser Company	:St. Paul, Minn.
Dean & Mrs. M. O. Withey	:University of Wisconsin	:Madison, Wis.
Mr. E. E. Woodman	:Durez Plastics Division -	:
Mr. & Mrs. Charles R. Wooster	: Hooker Chemical Corp.	:Chicago, Ill.
Mr. Curt A. Young	:	:Madison, Wis.
Mr. John Zerbe	:Continental Can Company	:New York, N.Y.
Mr. & Mrs. Gilbert W. Zieman	:Natl. Lumber Mfrs. Assn.	:Washington, D.C.
	:American Forest Products	:
	: Industries, Inc.	:Green Bay, Wis.

Name	Company	City & State

SPEAKERS AND SPECIAL GUESTS

Mr. E. C. Betts, Jr.	: U.S. Dept. Agr. - Dir. of Personnel	: Washington, D.C.
Mr. & Mrs. J. J. Byrne	: U.S. Forest Service	: Washington, D.C.
Mr. W. E. Difford	: Douglas Fir Plywood Assoc.	: Tacoma, Wash.
Pres. & Mrs. Conrad A. Elvehjem	: University of Wisconsin	: Madison, Wis.
Dr. George A. Garratt	: Yale University	: New Haven, Conn.
Mr. J. M. Gurd	: American Wood Preservers'	:
Mr. Frank J. Hanrahan	: Association	: New Westminister, B.C.
Dr. V. L. Harper	: American Institute of Timber	:
Prof. F. Kollmann	: Construction	: Washington, D.C.
Mr. & Mrs. Robert A. LaCosse	: U.S. Forest Service	: Washington, D.C.
Dr. Samuel Lenher	: University of Munich	: Munich, Germany
Dr. Richard E. McArdle	: Insulation Board Institute	: Chicago, Ill.
Mr. & Mrs. Stanton W. Mead	: E.I. du Pont de Nemours & Co.	: Wilmington, Del.
Hon. Gaylord A. Nelson	: U.S. Forest Service	: Washington, D.C.
Mr. & Mrs. Ivan A. Nestingen	: Consolidated Water Power	:
Mr. E. L. Peterson	: and Paper Company	: Wisconsin Rapids, Wis.
Mr. George E. Price	: Governor of Wisconsin	: Madison, Wis.
Mr. John G. Shope	: Mayor of Madison	: Madison, Wis.
Mr. Walter H. Swanson	: U.S. Dept. of Agr. - Assistant	:
Dr. & Mrs. Morris Wee	: Secretary	: Washington, D.C.
Mr. F. K. Weyerhaeuser	: National Homes Corporation	: Lafayette, Ind.
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	: Bethel Lutheran Church	: Madison, Wis.
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	: The Mead Corporation	: Dayton, Ohio

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Mr. John Barton	: United Press	: Madison, Wis.
Miss JoAnn Brooks	: Wood and Wood Products	: Chicago, Ill.
Mr. J. F. Burrell	: Plywood Magazine	: Indianapolis, Ind.
Mr. Bob Gates	: Wisconsin State Journal	: Madison, Wis.
Mr. Dave Gordon	: Wisconsin State Journal	: Madison, Wis.
Mr. & Mrs. Stanley M. Jepsen	: The Timberman,	:
	: The Lumberman	: Chicago, Ill.
Mr. Bill Kendall	: Plywood Magazine	: Indianapolis, Ind.
Mr. R. G. Lynch	: The Milwaukee Journal	: Milwaukee, Wis.
Mr. P. Freeman Heim	: Region 9, F.S.	: Milwaukee, Wis.
Mr. John McDonald	: Forest Prod. Research Soc.	: Madison, Wis.
Mr. & Mrs. E. B. Swingle	: Milwaukee Sentinel	: Milwaukee, Wis.

"Better Wood Products through Research"



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Research Associates

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Agustin N. Ramos, Jr., Physics and Engineering
Walter K. Tang, Timber Processing
Llewelyn Williams
Tokuo Yokota, Wood Chemistry



A BIRTHDAY party without a cake just wouldn't be complete. This one, however, made with plywood and decorated wood "candles" resists the efforts of two attractive members of the Laboratory staff.



Some Letters of Commendation

HEADQUARTERS
AIR MATERIEL COMMAND
UNITED STATES AIR FORCE
WRIGHT-PATTERSON AIR FORCE BASE

14 April 1960

RECEIVED
MCTEP

TO: Mr. Edward G. Locke
Director
Forest Products Laboratory
U. S. Department of Agriculture
Madison 5, Wisconsin

Dear Mr. Locke:

Best wishes on your Golden Anniversary. We regret we will be unable to join you on this occasion.

The Air Force has enjoyed a long and profitable association with the Laboratory. The studies and projects undertaken on behalf of the Air Materiel Command have been well developed and reflect credit on your staff.

We wish you continued success in the future.

Sincerely,

P. F. Curtis
P. F. CURTIS
Chief, Packaging Branch
Packaging and Materials
Handling Division
Directorate of Transportation



APR 14 1960

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FILE DESIGNATION

May 9, 1960

Edward G. Locke, Director
United States Department of Agriculture
Forest Products Laboratory
Madison 5, Wisconsin

Dear Mr. Locke:

We are indeed grateful for the notice and invitation to participate in the Golden Anniversary activities of the Forest Products Laboratory. The lab has done a tremendous job over the years and we would like nothing more than to join in the official observance of this great organization.

Unfortunately it does not now appear possible that this organization will be represented because of a membership meeting which is scheduled to fall during this same period of time. We regret this but as you know there are so many meetings being scheduled all the time and it is difficult to avoid certain conflicts.

The lab has accomplished a lot in the last fifty years; the next fifty years should hold even more promise.

Yours very truly,

AMERICAN WALNUT MANUFACTURERS' ASSOCIATION

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Secretary-Manager

OGR/rje

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1918 ASA 1960

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NEW YORK 1, N.Y.

April 12, 1960

Mr. Edward G. Locke, Director
Forest Products Laboratory
Forest Service
United States Department of Agriculture
Madison 5, Wisconsin

My dear Mr. Locke:

I have received the invitations which you addressed to Mr. John R. Townsend and to me, as Managing Director, to participate in the Golden Anniversary celebration at the Laboratory June 2 to 4.

Because of Mr. Townsend's activities as a Special Assistant to the Director of Defense, Research and Engineering, I am doubtful whether he can attend, but I will raise the question with him specifically at our Board meeting this week and if he can attend, I will let you know. As for myself, I shall be headed for Europe to attend the Council meeting of the International Organization for Standardization on June 3.

The work of the Forest Products Laboratory has been of very substantial importance in the development of various standards which have achieved approval as American Standard and I have long been impressed by the ready cooperation which has been extended by the highly competent personnel of the Laboratory.

With then my regrets that I cannot attend your celebration, may I extend my hearty congratulations on fifty years of accomplishment and my best wishes for your continuing success.

Sincerely yours,

G. F. Hussey, Jr.
G. F. Hussey, Jr.
Managing Director

DHA/r

Mr. Edward G. Locke, Director
United States Department of Agriculture
Forest Service
Forest Products Laboratory
Madison 5, Wisconsin

Dear Mr. Locke:

Your reference 1620

Thank you very much for your letter of March 28, inviting me to attend the Golden Anniversary of the U. S. Forest Products Laboratory, which will be celebrated June second, third, and fourth of this year.

I regret exceedingly that I will be unable to come because I have to be in South America at that time.

I think the Forest Products Laboratory has done an outstanding job and has had a very constructive approach to research problems affecting forestry and woods. The Laboratory has been most helpful to us in connection with our timber operations in the Upper Amazon area of Peru.

Very sincerely,

D. H. Allen
D. H. Allen
President

ASSOCIATION OF AMERICAN RAILROADS

RESEARCH CENTER
3140 SOUTH FEDERAL STREET
CHICAGO 16, ILLINOIS
CA 6-UN 8-8600

W. M. KELLER, VICE-PRESIDENT
G. H. MAGEE, DIRECTOR OF ENGINEERING RESEARCH

April 5, 1960

Mr. Edward G. Locke, Director
United States Department of Agriculture
Forest Products Laboratory
Madison 5, Wisconsin

Dear Mr. Locke:

I wish to thank you for the invitation to attend the Golden Anniversary of the U. S. Forest Products Laboratory on June 2, 3 and 4. Unfortunately I will not be able to attend, much as I would like to do so.

I have made several trips to your laboratory in connection with obtaining information on joint research projects we have had and have been most favorably impressed with your laboratory facilities and personnel.

My best wishes for a successful celebration of your Golden Anniversary

Yours very truly,

GMM:jh

CANADIAN LUMBERMEN'S ASSOCIATION

SECRETARY-MANAGER: O. E. BELL
TELEPHONE CE 3-4300

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TIMBER HOUSE
27 GOULBURN AVE.
OTTAWA 2
CANADA

W. PHILIP LAWRENCE, DIRECTOR
RESEARCH AND DEVELOPMENT DIVISION

April 11, 1960.
1620

Mr. E. G. Locke, Director,
Forest Products Laboratory,
United States Dept. of Agriculture,
Madison 5, Wisconsin.

Dear Dr. Locke -

I appreciate very much receiving your kind invitation to participate in the ceremonies commemorating the Golden Anniversary of the USFPL. Please believe me when I say that I am indeed sorry that I will not be able to attend.

As you probably know, I have visited your Labs on quite a number of occasions and have been most impressed on each of these. On behalf of our Association, I would like to congratulate you and your colleagues on the very fine record which the Lab has built up over the past fifty years and on the very high esteem in which you are held by the entire lumber industry on this continent.

My very best wishes for a successful anniversary.

Yours sincerely,

G. E. Bell, Manager.

GEB/ms

Battelle Memorial Institute

505 KING AVENUE COLUMBUS 1, OHIO

April 22, 1960

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Mr. Edward G. Locke, Director
Forest Products Laboratory
Madison 5, Wisconsin

Dear Mr. Locke:

I am sincerely sorry that I shall be unable to come to the Golden Anniversary of the Forest Products Laboratory.

All those who are familiar with the magnificent work which the laboratory has done over this period of time will join in congratulating you. I add my best wishes for many decades of continued service.

Sincerely yours,

B. D. Thomas
President

BDT:mkg

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HAMILTON, OHIO

April 13, 1960

Re: 1620

Mr. Edward G. Locke, Director
United States Department of Agriculture
Forest Products Laboratory
Madison 5, Wisconsin

Dear Mr. Locke:

I acknowledge with many thanks your invitation of March 28 to participate on June 2-4 in the Golden Anniversary of the Laboratory.

At present, it unfortunately looks like it will not be possible for me to accept this opportunity. If conditions should change and it develops later that I might attend at least part of the functions, I may contact you to see if accommodations are still in order.

I regret that circumstances apparently will not permit me to attend, because I have enjoyed the associations for many years with Gardner Chidester and his staff, and others of the Forest Products Laboratory team. We have had a very high regard over the years of the excellent work which the Forest Products Laboratory has done. We hope that your activities and welfare will continue to grow with the years.

Thanks again, and best wishes.

Sincerely yours,

W. P. Lawrence, Director
Research and Development Division

WPL:dj

U. S. DEPARTMENT OF COMMERCE
BUSINESS AND DEFENSE SERVICES ADMINISTRATION
WASHINGTON 25, D.C.
April 12, 1960

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Mr. Edward G. Locke, Director
Forest Products Laboratory
U. S. Department of Agriculture
Madison 5, Wisconsin

Dear Mr. Locke:

We greatly appreciate the invitation extended to our Director, Mr. Charles A. Lewis, to attend the Golden Anniversary of the Forest Products Laboratory to be held in Madison, June 2 to 4, 1960.

Mr. Lewis will be out of country for an extended period and, therefore, will be unable to attend.

This office has always recognized the Forest Products Laboratory as the world's standard for package testing.

We take this opportunity to extend to you our very best wishes for a successful Golden Jubilee Program.

Sincerely yours,
A. B. Cluman

A. B. Cluman, Acting Director
Containers and Packaging Division



EDISON ELECTRIC INSTITUTE
780 THIRD AVENUE • NEW YORK 17 • YUKon 6-4100

May 31, 1960

Mr. Edward G. Locke, Director
Forest Products Laboratory
Madison 5, Wisconsin

Dear Mr. Locke:

It is my pleasure to transmit the following resolution adopted by the EEI Transmission and Distribution Committee Timber Products Task Force at its meeting on May 11, 1960:

"Whereas the Forest Products Laboratory of the Department of Agriculture at Madison, Wisconsin, has through the years made great contributions to the study of wood preservation and has in many ways helped both producers of wood preservatives and users of preservatives and wood preserved by various preservatives, which includes power and light companies,

"And whereas the Forest Products Laboratory is having a celebration of its 50 years of existence June 2, 3 and 4, 1960 at which time the many accomplishments of the Forest Products Laboratory will be listed,

"Be it therefore resolved that the Timber Products Task Force of the Transmission and Distribution Committee of the Edison Electric Institute show its appreciation to the Forest Products Laboratory by thanking it for the great help which it has given the power companies in its wood preservation work and wishes the Forest Products Laboratory many more years of useful service to our country. Carried unanimously at the meeting of Timber Products Task Force, Pittsburgh, Pennsylvania, May 11, 1960."

Very truly yours,

W H Johnson
W H Johnson, Chairman
Timber Products Task Force



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T. J. CONNELLY
President

April 12, 1960

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Mr. Edgar G. Locke, Director
Forest Products Laboratory
United States Department
of Agriculture
Madison 5, Wisconsin

Dear Mr. Locke:

Ref: 1620

Thank you very much for your invitation of March 28 to attend the Laboratory's Golden Anniversary June 2 to 4. You were also kind enough to invite Mr. T. A. Dean, our Chairman.

Unfortunately, it so happens that right at that part of June, neither of us will be available to attend this very fine ceremony. We are sorry we will have to miss it.

However, I would like to take this opportunity to congratulate you and your staff on the splendid work which is being done by the Laboratory. Your efforts have meant a lot to the development of the entire wood industry as well as wood conservation programs in the United States. You are doing splendid job and I hope that during the next 50 years the Laboratory can live up to the challenge of the past 50.

With best regards, we are

Yours very truly,

THE DEAN COMPANY

T. J. Connally
President

TJC:Mc



H. B. Fuller Company

235 EAGLE STREET • SAINT PAUL 2, MINNESOTA PHONE CA. 2-5555

PLANTS CONVENIENTLY LOCATED IN
SAINT PAUL, MINNESOTA LINCOLN, NEW YORK
KANSAS CITY, MISSOURI CHICAGO, ILLINOIS
CINCINNATI, OHIO ATLANTA, GEORGIA
DALLAS, TEXAS MEMPHIS, TENNESSEE
TAMPA, FLORIDA PORTLAND, OREGON
CHICAGO, ILLINOIS LOS ANGELES, CALIFORNIA
SAN FRANCISCO, CALIFORNIA WINNIPEG, CANADA

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File Ref: 1620

Thank you for your kind invitation to attend the Golden Anniversary of the U. S. Forest Products Laboratory at Madison.

As manufacturers of industrial adhesives, we naturally have had many opportunities to become acquainted with your services, facilities, and personnel. Many benefits have derived from this contact and association and we are naturally pleased that we can be of some service in the utilization of our fine forest products.

Unfortunately, I have a personal conflict. My college graduating class is celebrating its Silver Anniversary on the same date, and although gold is generally more attractive than silver, I find my personal interest pretty deep in my own graduating class. Unfortunately, I will not be present.

I do want to extend my congratulations to the Forest Products Laboratory on the fine service they have performed in the past 50 years.

Cordially yours,

H. B. FULLER COMPANY

Richard E. Smith
Richard E. Smith, Vice-President
Research and Development

RES:k

HARVARD UNIVERSITY

GRADUATE SCHOOL OF BUSINESS ADMINISTRATION

GEORGE F. BAKER FOUNDATION

WINDSOR ARNOLD HOSMER
Professor of Business Administration

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SOLDIER FIELD
BOSTON 63, MASSACHUSETTS
APR 13 1960
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April 13, 1960
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THE INSTITUTE OF PAPER CHEMISTRY
Appleton, Wisconsin

APR 13 1960

April 4, 1960

Mr. Edward G. Locke, Director
United States Department of Agriculture
Forest Service
Madison 5, Wisconsin

Dear Mr. Locke:

I appreciate your invitation to attend the Golden Anniversary of the U.S. Forest Products Laboratory. Unfortunately, my duties here will make it impossible for me to be in Madison.

The accomplishments of the Laboratory in establishing through its own work and that of others inspired through its example are outstanding in American industry as a whole. You and your associates together with all of those who have served in earlier years have a right to be proud of these accomplishments. Both my interest in the Forest Products Laboratory and my study of other industries over many years lead me to a very special appreciation of the accomplishments.

I regret that it will be impossible for me to accept your invitation and that of the laboratory.

Very truly yours,

W. Arnold Hosmer
W. Arnold Hosmer

WAH:jan

The Michigan College of Mining and Tech

FOREST PRODUCTS RESEARCH DIVISION

Dr. Edward G. Locke
Director
Forest Products Laboratory
Madison 5, Wisconsin

FPL RECEIVED
HOUGHTON, MICHIGAN
July 26, 1960
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ROYAUME DE BELGIQUE
MINISTÈRE DE L'AGRICULTURE

Laboratoire forestier de l'Etat

GEMBLoux
(Belgique)

N°
ANNEXE

Dr. Edward G. Locke, Director
U. S. Forest Products Laboratory
Madison 5, Wisconsin

Dear Dr. Locke:

Please accept our congratulations on the 50th Anniversary of the Forest Products Laboratory and our good wishes for a second half-century of service. To us who are involved with forest products research in the field, "50 years of service" of FPL has a real meaning.

Location with ready access to F.P.L. at Madison has had a significant effect upon the design and execution of the Forest Products research program at Michigan Tech. In being able to depend upon the ready cooperation of your organization we have accomplished much more in our own service to the State of Michigan than we could have done in a more remote location.

We are glad to acknowledge that many of the accomplishments of our program have followed original cooperative research work done at the Forest Products Laboratory. The reopening of the pulpmill at Ontonagon for the production of semi-chemical corrugating board from hardwoods was considerably influenced by a study incorporating a cooperative pulping project on our native hardwoods. The establishment of the Celotex operation at L'Anse was preceded by a cooperative fibre board project conducted at F.P.L. We are now presenting to industry a proposal for bleached foodboard production in our area; the report contains a pulp and paper making section based upon a cooperative project between our two agencies.

The above are only some of the more spectacular examples of cooperation. Our staff has many times called upon the staff of F.P.L. for specific help in our program work. Not the least of the cooperative effort has been the assistance we have had from your staff in extending wood research into the industry of our area, particularly in the field of sawmilling and lumber drying.

You may be sure that Michigan Tech is proud of its past association with the Forest Products Laboratory and looks forward to a continuing joint effort to bring improved utilization to the forest resources of Michigan.

Cordially yours,
Herford Garland
Herford Garland
Director

HG:hh

Cl. Dem. Biennale - 1952 - 83 - 1.000

The Director and staff of the State Forestry Laboratory at Gembloux, Belgium, are happy and proud to be able to bring to the Director and to the large team of researchers at the Forest Products Laboratory, on the occasion of their Golden Jubilee, the testimonial of their admiration and of their recognition, and at the same time of their deep and cordial congratulations.

Personally, the Director of the Forestry Laboratory at Gembloux recalls with emotion the infinitely kind welcome with which he was received each day during his so profitable stay which he made at that magnificent research institution in August and September 1951. He salutes the founders with respect and sends very eager wishes for it to pursue with success and untiringly, as it has done up to now, its efforts for the more efficient utilization of wood.

The Director,

J. A. G. Fouarge

Joseph A. G. Fouarge

MINNESOTA MINING AND MANUFACTURING COMPANY

GENERAL OFFICES • 600 BURN AVENUE • SAINT PAUL 6, MINNESOTA • TELEPHONE PR. 6-6511

April 19, 1960

Edward G. Locks, Director
United States Department of Agriculture
Forest Service
Forest Products Laboratory
Madison 5, Wisconsin

Reference: 1620

Dear Mr. Locke:

Thank you very much for your invitation to the Fiftieth Anniversary Program of the Forest Products Laboratory. Certainly those fifty years have been memorable ones for your organization and your contributions to the progress of scientific research are nationally known. We at Minnesota Mining and Manufacturing Company have great respect for the work done at Forest Products Laboratory and are appreciative of the contributions your laboratories have made to industry. Our congratulations and best wishes will be with you on June 2, 3, and 4, 1960.

Unfortunately, due to prior commitments, I will be unable to personally attend this celebration. This will certainly be a personal loss to me.

Yours very truly,

W.C. O'Leary
W.C. O'Leary, Technical Director
Adhesives, Coatings and Sealants Division

jf

NATIONAL ASSOCIATION OF HOME BUILDERS
NAHB
National Housing Council
1625 L STREET • N.W. • WASHINGTON 6, D.C.

April 22, 1960

Mr. Edward G. Locks, Director
United States Department of Agriculture
Forest Service
Forest Products Laboratory
Madison 5, Wisconsin

Dear Mr. Locke:

On behalf of the National Association of Home Builders, I extend sincere congratulations on the commemoration of the Golden Anniversary of the Forest Products Laboratory. The services and accomplishments of the Laboratory are well recognized by the home building industry. The Laboratory has made many noteworthy contributions to the advancement of housing technology.

Our Technical and Research Departments have often worked closely with members of your staff on matters of common interest. Mr. Ralph Johnson and others of our staff have expressed the high regard they hold for the scientific integrity and creative leadership of the Laboratory. We know that the future of the Laboratory promises even greater achievements in the area of forest products research, and we hope that you will look to the support of NAHB and our over 40,000 members in the pursuance of our mutual objective of providing better housing for the American public.

I regret that prior commitments of Mr. Johnson and myself make it impossible for either of us to attend the June 2nd observance of the Laboratory Anniversary. We send our best wishes for an enjoyable occasion.

Sincerely,

John M. Dickerman
John M. Dickerman
Executive Vice President

JMD:cot

MOORE DRY KILN COMPANY

MANUFACTURERS LUMBER AND VENEER DRYING



STACKING AND UNSTACKING SYSTEMS

P.O. BOX 4240
TELEPHONE ELGIN 4-2301
CABLE ADDRESS MOOREKIN
JACKSONVILLE 1, FLORIDA

MANUFACTURING PLANTS
JACKSONVILLE 1, FLORIDA
VANCOUVER B.C. CANADA
BRANTFORD ONT. CANADA
NORTH PORTLAND, OREGON

April 14, 1960

Dr. Edward G. Locks, Director
Forest Products Laboratory
Madison 5, Wisconsin

Dear Dr. Locke:

Thank you for your recent invitation for us to attend the Forest Products Laboratory's Golden Anniversary on June 2nd, 1960. We regret that we will be unable to be on hand for this momentous occasion.

We wish to congratulate you and your associates on the splendid job which the Laboratory is doing for the forest products industry today. I am sure that many of the techniques as well as the different uses for wood today can be directly attributed to the work of the Lab during the past fifty years. Our organization is well aware of this fact and we wish to congratulate you and your associates on this 50th Anniversary and I am sure that the next fifty years will open up greater uses for wood than any of us have ever dreamed.

Please feel free to call on our organization if we can assist you or other members of the Forest Products Lab in any way. If you have any occasion to be in Jacksonville or North Portland, Oregon, a visit by you or other members of the Lab will be most welcome.

With kind regards.

Sincerely,

Pat Williams Jr.
Vice President

PMWilliamsJr/ls

National Paint, Varnish and Lacquer Association

INCORPORATED

1500 RHODE ISLAND AVE., N.W. • WASHINGTON 5, D.C.

CABLE ADDRESS NAPPA

OFFICERS
JOSEPH F. O'LEARY, WASHINGTON
VICTOR J. COOPER, WASHINGTON
H. BRATH DAVIS, BALTIMORE
EXECUTIVE SECRETARY
LAURENCE REIFER, WASHINGTON
TREASURER
T. E. HARRIS, PHILADELPHIA
SECRETARY
ALLAN W. GATES, WASHINGTON

REGIONAL VICE PRESIDENTS
NEW ENGLAND-D. W. GREENE, PROVIDENCE
EASTERN R. J. ECKART, NEW YORK
CENTRAL EDWARD A. FOY, CINCINNATI
SOUTHERN PAUL B. CYPRIAN, ATLANTA
SOUTHWESTERN C. C. LAMBERT, HOUSTON
WESTERN HENRY S. HUNTER, DENVER

April 11, 1960

Ref: 1620

DR. EDWARD G. LOCKE, Director
U. S. Department of Agriculture
Forest Products Laboratory
Madison 5, Wisconsin

Dear Mr. Locke:

It is with deep regret that previous commitments will prevent me from accepting your kind invitation to participate in ceremonies commemorating the Golden Anniversary of the U. S. Forest Products Laboratory.

The Technical Director of the National Paint, Varnish and Lacquer Association, Charles E. Loucke, who also received an invitation, will attend. He will accept in person.

I fully agree with you that there is merit in recognizing those who had the foresight and initiative to found the Forest Products Laboratory. They pioneered in a field where there was little public appreciation at that time of the need for a scientific institution devoted to forest products research. Some of the results of their work are now well known and the Forest Products Laboratory has a reputation for excellence throughout the world. All those connected with the Laboratory can feel justifiable pride in such a fine institution.

The National Paint, Varnish and Lacquer Association has worked with the Forest Products Laboratory for many years and we are grateful for the cooperation we have received, as well as for the flow of scientific information that has been so helpful to us.

Congratulations on the 50th Anniversary of the U. S. Forest Products Laboratory and may the next fifty years be as rewarding as the past.

With kind personal regards.

Sincerely yours,
Joseph F. O'Leary
President

FPI RECEIVED

MAR 13 1960

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Retention
Permanent ()
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PROGRESS THROUGH COOPERATION

NATIONAL SCIENCE FOUNDATION
OFFICE OF THE DIRECTOR
WASHINGTON 25, D.C.

April 6, 1960



Dr. Edward G. Locke, Director
Forest Products Laboratory
U. S. Department of Agriculture
Forest Service
Madison 5, Wisconsin

Dear Dr. Locke:

I have received your letter regarding the observance of the Laboratory's Golden Anniversary from June 2-4 and the invitation to participate in this celebration. I regret very much that I have other commitments at that time which make it impossible to be present.

The record of the Laboratory speaks for the importance of this occasion and the many contributions it has made during the past fifty years not only to the preservation of our forests but to their utilization in the public interest.

Please accept the congratulations and best wishes of the National Science Foundation on this very special occasion.

Sincerely yours,

Alan T. Waterman
Alan T. Waterman
Director

Affiliate Member of American Paper and Pulp Association

PAPER INDUSTRY MANAGEMENT ASSOCIATION

Office of Secretary and Treasurer
HARRY E. WESTON
10 North Clark Street
Telephone ANDover 3-1474
CHICAGO 2, ILLINOIS

OFFICERS
A. C. McCorry, President
Tom S. Caldwells, 1st Vice President
C. L. Johnson, 2nd Vice President
Boris P. Wood, 3rd Vice President
Glen T. Rasmussen, 4th Vice President
E. W. Murrfield, 5th Vice President

TRUSTEES
Raymond L. Barton
F. L. Zellers
Howard E. Hulley
A. E. Johnson
Howard H. Street
Roy H. Kelly, Emeritus

April 28, 1960

FPL RECEIVED

Mr. Edward G. Locke, Director
United States Department of Agriculture
Forest Service
Forest Products Laboratory
Madison 5, Wisconsin

Re: 1620

APR 28 1960

FPL RECEIVED

Dear Mr. Locke:

Both Mr. A. C. McCorry, St. Regis Paper Company, Tacoma, Washington (President of our Association) and I have given every consideration to your kind invitation of March 28, 1960 to participate in ceremonies commemorating the Golden Anniversary of the Laboratory. Both of us would like so much to be with you, but your splendid program comes too close to the meeting dates of our 41st Annual Convention to allow us to do so. We are to meet in San Francisco on June 7-9, and the Convention dates proper are preceded by a Board of Directors Meeting on June 6.

The Laboratory has been a beacon down through the years of its existence to which many of us concerned with wood utilization have looked for guidance. It always has been willing to listen and to help. I am sure that even with its outstanding accomplishments of the past fifty years that the program ahead shall witness even greater accomplishments.

I am so sorry that neither Mr. McCorry nor I can be with you for the observance of the Laboratory's Golden Anniversary, but I know that you will understand the reason for our absence.

Sincerely yours,
Harry E. Weston
Harry E. Weston
Secretary and Treasurer

OZAN LUMBER COMPANY
MANUFACTURERS
YELLOW PINE LUMBER



PREScott, ARKANSAS

April 4, 1960

FPL RECEIVED

APR 6 1960
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Re: No. 1620

Dear Mr. Locke:

In response to yours of March 28th, I appreciate very much the invitation to attend the Laboratory's Golden Anniversary observance, June 2nd to June 4th, and I regret that because of a prior commitment I cannot be present.

It has been my privilege to visit the Laboratory on several occasions as one of the representatives of the lumber industry. I am sure all of us who know of the work of the Laboratory recognize the wonderful contribution it has made in the fifty years it has been in operation, and I feel certain with the fine staff of dedicated men and women that much progress will be made in the next fifty years.

I do appreciate the invitation, and again I wish to express my regret because of my inability to attend.

Sincerely yours,

J.R. Burns

PICKERING LUMBER CORPORATION

MANUFACTURERS
CALIFORNIA SUGAR PINE :: CALIFORNIA PONDEROSA PINE
MOULDINGS :: CUT STOCK
STANDARD, CALIFORNIA

Thursday
May 5, 1960

FPI

MA

FILE :

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Mr. Edward G. Locke, Director
Forest Products Laboratory
United States Department of Agriculture
Madison 5, Wisconsin

1620

Dear Mr. Locke:

This will acknowledge your letter of March 28, 1960 inviting me to attend the 50-year anniversary of the Forest Products Laboratory to be held in Madison, Wisconsin, in early June.

I would certainly like to indicate my interest in the work that your laboratory and other similar laboratories, which have followed your lead, have done in the way of forest products research over the years. Although I will not be able to attend because of pressing regular duties here, please accept my congratulations on your past record and my best wishes for the future.

You're very sincerely

H. C. Abraham
H. C. Abraham
General Superintendent

HCA/tm



POPE & TALBOT, INC.

CHARLES L. WHEELER
SPECIAL VICE PRESIDENT100 BUSH STREET
SAN FRANCISCO 4TELEPHONE
DOUGLAS 2-2881

April 7, 1960

Mr. Edward G. Locke
Director
Forest Products Laboratory
Madison 5, Wisconsin

Dear Mr. Locke:

I sincerely appreciate your kind invitation to join you in celebrating the 50th Anniversary of the Forest Products Laboratory. Unfortunately, meetings with personnel of the Navajo Forest Products Industries and a trip to Europe in June will prevent my attending.

The Laboratory personnel are to be congratulated for the many contributions made to increased wood utilization. What a record it has achieved, during the past fifty years....and what a record it will achieve in the next half century!!

CLW/h

1849 West Pershing Road • Chicago 9, Illinois • Lafayette 3-5500, Ext. 4262 or 4267

RESEARCH and DEVELOPMENT Associates FOOD and CONTAINER INSTITUTE

7 April 1960

Mr. Edward G. Locke, Director
United States Department of Agriculture
Forest Service
Forest Products Laboratory
Madison 5, Wisconsin

Dear Mr. Locke:

Thank you very much for your invitation to the Golden Anniversary of the Forest Products Laboratory. I am sorry that I will be in California at that time and cannot attend.

The Forest Products Laboratory can be most proud of its record. I was in close touch with your organization during World War II and received most valuable help.

There is no doubt in my mind but that you carried out "Teddy" Roosevelt's fondest expectations in the preservation of forests and wise use of forest products.

Sincerely yours,

ROHLAND A. ISKER
Col., USA-Ret'd.
Secretary

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RATIONALISIERUNGS-GEMEINSCHAFT VERPACKUNG
IM RATIONALISIERUNGS-KURATORIUM DER DEUTSCHEN WIRTSCHAFT

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MAY 20 1960

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Date 09.02.91	
Dr. M/Sk May 17, 1960	

RG Verpackung, Berlin-Schmargendorf, Auguste-Viktoria-Str. 66

BY AIR MAIL!

Forest Products Laboratory
U.S. Department of Agriculture
Forest Service
Madison 5
WISCONSIN / U.S.A.

Ihre Zeichen Ihre Nachricht vom Unsere Nachricht vom

Unser Zeichen Dr. M/Sk May 17, 1960

Betreff:

Gentlemen:

We were pleased to learn from the U.S. trade press that recently you could celebrate your Golden Jubilee. We, therefore, take pleasure in presenting to you our sincerest congratulations.

On this occasion we won't fail to express herewith our heartfelt thanks for your painstaking attention given to our requests, so that we were able to evaluate your excellent reports and scientific research material. We can assure you that the German packaging industry, too, takes great interest in your pioneer work which paved the way toward bigger and more complex packaging responsibilities in every branch of industry.

We wish you good luck and prosperity for your further activities and are looking forward with greatest pleasure for our future good co-operation.

Yours very sincerely,
Rationalisierungs - Gemeinschaft
Verpackung
im Rationalisierungs - Kuratorium
der Deutschen Wirtschaft (KKW)

Hoffmann (Dr. Mannick)

E EUROPEAN
PACKAGING
FEDERATION
GRUNDUNGSMITGLIED

THE SHERWIN-WILLIAMS CO.

11541 S. CHAMPLAIN AVENUE
CHICAGO 29, ILLINOIS

FPL RECEIVED

APR 25 1960

FILE DESIGNATION

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Mr. Edward G. Locke, Director
United States Department of Agriculture
Forest Service
Forest Products Laboratory
Madison 5, Wisconsin

Dear Mr. Locke:

I have delayed my reply to your kind invitation of March 28 to join you in celebrating the fiftieth anniversary of the Forest Products Laboratory. I have done so in the hope that I could resolve a conflict with a trip I have scheduled for May 29 through June 6. Since I have not been able to do so, I must inform you that to my regret I am unable to accept your invitation.

Since I cannot be present in person I should like to take this opportunity to extend my congratulations and those of the Sherwin-Williams Company to you and your entire staff on this important occasion. We have had many contacts with the Forest Products Laboratory and we have made considerable use of your publications. We believe we are in a good position to appreciate how much you have contributed to forestry research, in the building industry and in the general field of wood finishing.

May the next half-century be a period of continuing success.

Very truly yours,

THE SHERWIN-WILLIAMS COMPANY

M. Lynn Lee
Director of Paint Research

MVL:AR

DIVISIONS
ADMINISTRATIVE SERVICES
BEACHES AND PARKS
FORESTRY
NINJA
OIL AND GAS
SMALL CRAFT HARBORS
SOIL CONSERVATION

EDWARD G. BROWN
GOVERNOR



STATE OF CALIFORNIA
DEPARTMENT OF NATURAL RESOURCES
SACRAMENTO 14

April 4, 1960

Mr. Edward G. Locke, Director
Forest Products Laboratory
U. S. Forest Service
Madison 5, Wisconsin

Dear Mr. Locke:

Thank you for your cordial letter of March 28, 1960, inviting me to join with you and the staff of the Forest Products Laboratory in celebrating the Laboratory's Golden Anniversary in June.

Certainly, this is a worthy celebration for I know of no single element of government that has contributed more to the benefit of a resource and industry and the people than has the Laboratory. It has been my privilege several times to visit the Laboratory but in 1941 I had the opportunity of spending five days there as a representative of Regional Forester Show delving into the many projects on which you were working. That was a real opportunity.

It is with deep regret that I can not be with you at your Golden Anniversary but to you and your staff I extend California's congratulations and best wishes for the future.

Sincerely yours,

DeWitt Nelson
DeWitt Nelson, Director

COOPERATIVE EXTENSION WORK

COLLEGE OF AGRICULTURE AND
HOME ECONOMICS OF THE OHIO
STATE UNIVERSITY AND THE
UNIVERSITY DEPARTMENT OF
AGRICULTURE COOPERATING

AGRICULTURE AND HOME ECONOMICS
STATE OF OHIO

2120 FIFTH ROAD
COLUMBUS 10, OHIO
OFFICE OF DIRECTOR

April 26, 1960

Edward G. Locke, Director
U. S. Department of Agriculture
Forest Service
Forest Products Laboratory
Madison 5, Wisconsin

Dear Director Locke:

We would agree with you that there is merit in recognition planned for the research program conducted at the Forest Products Laboratory during the past 50 years. It would be a very real pleasure to me to be able to attend the event for the entire three days if my schedule would permit. I do however, have serious conflicts and will not be able to attend.

The Forest Products Laboratory has contributed much to the foundations of the science of forestry and wood utilization. It has consistently produced useable and basic applied research information which has been invaluable in the nationwide Extension Forestry Program. You may rest assured that Forest Products Laboratory will continue to receive unqualified support of Cooperative Extension Service in our state. I am sure the same is true for other states throughout the country.

We would like very much to have our Ohio staff represented at the event. However under the circumstances I'm not so sure that will be possible. Our Extension Forester, William F. Coven, is scheduled for an important family meeting in Rhode Island on the dates of the event. If by chance we can adjust schedules here and be represented we will most assuredly do so. Best wishes for a successful event.

Very truly yours,

W.B. Wood
W. B. Wood, Director
WBW:jkd

cc: William F. Coven

DEWITT NELSON
DIRECTOR OF NATURAL RESOURCES
EDWARD F. DODLER
DEPUTY DIRECTOR

STATE OF INDIANA
HAROLD W. HANDLEY, GOVERNOR
DEPARTMENT OF CONSERVATION



INDIANAPOLIS 9

April 4, 1960

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Mr. Edward G. Locke, Director
Forest Service
Forest Products Laboratory
Madison 5, Wisconsin

Dear Mr. Locke:

Thank you for your kind invitation of March 28 to attend the observance of the Laboratory's Golden Anniversary, June 2 to 4.

While we would like very much to be with you, I am afraid we have too many irons in the fire to accept your kind invitation.

The Laboratory is a wonderful institution. We have the highest respect and regard for what is being done and the wonderful staff employed. We also know that by the time another 50 years rolls around the contributions of the Laboratory are going to be of great significance.

Very truly yours,

Ralph F. Wilcox
Ralph F. Wilcox
State Forester

RFW/o

WEST COAST LUMBERMEN'S ASSOCIATION

OFFICE OF THE PRESIDENT
ELIOT H. JENKINS
2290 LINCOLN STREET
EUGENE, OREGON

1410 S. W. MORRISON STREET
PORTLAND 8, OREGON

April 11, 1960

FPL REC
File 1620 APR 1

FILE DOCK

Retention
Permanent
5 - year
1 - year

Mr. Edward G. Locke, Director
Forest Products Laboratory
United States Department of Agriculture
Forest Service
Madison 5, Wisconsin

Dear Ed:

It seems these days that it is a pretty hard proposition to plan any meeting far enough ahead to miss conflicts. In spite of my earnest desire to attend the Laboratory's Golden Anniversary I do have a conflict that is impossible to avoid. I hasten to assure you that I have asked Hal Simpson to see that WCLA is represented in line with the importance of the occasion.

I certainly agree that the founders who struggled with the project in the beginning learned what a real struggle can be. I like to think that people like them worked as they did because they believed they were right and for them to know what their labor actually amounted to in later years would be no particular surprise in their minds there could be no other answer.

I would like as President of WCLA, on behalf of the members and directors, extend our hearty congratulations for fifty years of outstanding service to the Nation and the forest products industry. It goes without saying that our every good wish goes for the future. Our earnest hope is that WCLA will never be found lacking in 100% cooperation with your fine organization in the future as we have tried so hard to do in the past.

Yours truly,

Eliot H. Jenkins

Eliot H. Jenkins

HEADQUARTERS
Wright Air Development Division

AIR RESEARCH AND DEVELOPMENT COMMAND
UNITED STATES AIR FORCE
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

REPLY TO: WWRONG (Mr. W. E. Dirkes)
ATTN OF:

SUBJECT: FPL Golden Anniversary

TO: United States Department of Agriculture
Attn: Dr. E. G. Locke
Director
Forest Service
Forest Products Laboratory
Madison 5, Wisconsin

1. The Forest Products Laboratory has established a truly enviable record during fifty years of service to our country, and it is indeed a pleasure for me to extend my congratulations on the occasion of your Golden Anniversary. The laboratory founders and the people who have maintained high standards over the years all deserve recognition for their accomplishments.
2. The scientific research of the Forest Products Laboratory is a matter of international recognition, and there is little I could add to the fact of the achievement. But I would like to take this opportunity to voice my appreciation to Forest Products Laboratory personnel for the many times they have provided invaluable assistance to the Air Force in materials research programs, and in particular to the excellent work completed within the structural materials area.
3. Congratulations on the occasion of your Golden Anniversary, and best wishes for continued success.

W.E. Dirkes
W. E. DIRKES
Chief, Plastic Branch
Nonmetallic Materials Laboratory
Materials Central

HEADQUARTERS

Wright Air Development Division

AIR RESEARCH AND DEVELOPMENT COMMAND
UNITED STATES AIR FORCE
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

FPL RECEIVED

4 MAY 1960

MAY 9 1960

FILE NUMBER

REPLY TO: WWRONG (Mr. R. T. Schwartz)
ATTN OF:

SUBJECT: FPL Golden Anniversary

TO: United States Department of Agriculture
Attn: Dr. E. G. Locke
Director
Forest Service
Forest Products Laboratory
Madison 5, Wisconsin

1. Congratulations on the occasion of the Forest Products Laboratory Golden Anniversary. The Forest Products Laboratory can be justly proud of its record of achievement during these fifty years of service. Although the scope of your activity extends beyond our field of mutual interest, our cooperative efforts in the area of structural materials have given the Air Force materials people a true appreciation of the value of services rendered by your Laboratory.

2. The Air Force has transferred funds to the Forest Products Laboratory for materials research over a continuous period of over 20 years. Yours is one of the very few organizations which has such high standards and has continuously provided such excellent work as to have received support from the Air Force in materials research and development for such an extended continuous time period.

3. We agree wholeheartedly in the desirability of recognition for those who have managed so well to found an organization with international recognition of its scientific achievements. We have been proud to be associated with you over these many years, and hope that these fruitful relations can be continued for many more. All of us here at the Wright Air Development Division who have associated with you over the years, join in extending congratulations for the excellent record of achievement that all of you have helped to establish and maintain these fifty years.

R. T. Schwartz

R. T. SCHWARTZ, Chief,
Nonmetallic Materials Laboratory
Materials Central

Acknowledgments

Grateful acknowledgment is made to the distinguished speakers, the University of Wisconsin, the Madison Chamber of Commerce, the Four Lakes Council Boy Scouts of America, the Washington Office of the Forest Service, various forest products industries, numerous local merchants, members of the several committees, and all the 375 employees of the Forest Products Laboratory without whose help these events would not have been possible.

Especial acknowledgment is made to the following press representatives for their valuable cooperation: J. F. Burrell, Plywood; Donald K. Davies, Wisconsin State Journal; Stanley F. Horn, Jr., Southern Lumberman; J. F. Koellisch, Wood and Wood Products; John K. McDonald, Forest Products Research Society; Dean F. Sherman, Lumberman; and Havens K. Wilber, Capital Times.

ANNIVERSARY GENERAL COMMITTEE

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FPL Used Auto Gyro Principle To Create Free Fall Container

EXCERPTS: This is the first of a series of stories concerning various phases of activities at the Forest Products Laboratory (FPL) in Madison which have recently been released from restrictions.

By JOHN W. HOWE



'Cold Soda' to Give US More Newsprint

Laboratory at Madison Develops Lower Cost Hardwood Process; Firms Plan Mills

The use of America's abundant hardwoods in the production of newsprint appears headed for considerable growth in the years ahead because of a process developed by the Ford Motor Company.

A cold soda solution is used in the process, which was developed at the laboratory two weeks ago. It can be produced at a cost of \$1.50 per ton, compared with \$2.50 per ton for the old method.

The new process will increase the output of wood pulp for printing paper.

Roslyn Paper Mill Plant

In this country, only 10 percent of the paper made is from wood pulp.

For instance, in 1948, the Ger-



Ford Tests "Impreg." Wood Product That Won't Swell, to Shape Dies for '56 Line

By JOHN W. HOWE
Staff Writer, The Journal Times
and Milwaukee Journal

Developed In Forest Lab

New Hardwood Flooring Can Be Laid On Concrete

In response to increasing demands for hardwood flooring that can be laid direct on concrete, the Forest Products Laboratory has developed a product called "Impreg."

"The special cut is in precarious balance with new growth," says Dr. Hall, "but too much of our growth is on kinds and qualities that are not good for use."

Saving the Trees Federal Scientists Find Ways to Trim Waste, Stretch Wood Supply

By Richard P. JANKOWSKI
Staff Writer, The Journal Times

Saw Saves on Sawdust

By Richard P. JANKOWSKI
Staff Writer, The Journal Times
MADISON, Wis.—A husky chipper saw

First Minehunter Made of Laminated Preserved Timber Launched

To first ship to utilize preserved pressure-treated

Paint Coat Affected by Various Factors

Forest Service Laboratory

Use Madison to Illustrate Some of the Results of

In Wide Use In Public Areas Through County

New "modified stain" for treating and preserving wood outdoors has been developed by the U.S.

Forest Service's Forest Products Experiment Station at State College here, revealed Wednesday.

Conway said the new stain, which almost anybody can whip



three sizes, is being applied to a number of buildings for signs and buildings on the State College grounds and a number of other places. New fences at the Coconino County Fairgrounds in Flagstaff, Ariz., were painted with the stain.

Coconino County Fairgrounds in Flagstaff, Ariz., were painted with the stain.

"Better Wood Products through Research"

